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ceramic finishes on metal

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THE Finish Line

Charles K. Woodin

"When he stepped out of the University of Illinois as an engineer, Charlie Woodin stepped into the burgeoning washer industry. As a man who could iron out production difficulties he soon found himself inventing, and from there proceeded to become a consulting engineer and patent attorney. In 1924 Charlie had Gueder Paeschke & Frey draw the first one piece steel tub . . . His handiwork can be found throughout the industry."

From "Electrical Merchandising."

WHAT ABOUT WASHING MACHINES? — From the claims and counter-claims that have been made regarding what may be expected in household appliances of the future, it would not be surprising if Mrs. America were to expect something radically different in her new washing machine — when, as and if it is available.

That the washer industry is on its toes is quite evident, and that the industry's after-the-war products will offer all *proved* advancements is a foregone conclusion.

Washer manufacturers have covered some hard ground in getting where they are today. It is probable that experience of the past will not be discarded in planning for the future.

Opinion based on experience

An interesting opinion on this subject appeared in the February 1944 issue of "Electrical Merchandising" under the heading "A Patent Attorney Peers Into The Washing Machine Future." We quote from this article by Charles K. Woodin:

"I have spent a lifetime in the washer business, and they say, hindsight is better than foresight. So my two cents worth to you is — that while I think that new models will be the lifeblood of trade, the fellows who will make them won't throw away the experience of the past.

"We started out in this business making wooden tub washers with oscillating peg dollys. No kidding, they were really good washers, and we proved to Mrs. Doubting Thomas that they would wash dirty clothes clean. That was on the QED (show me) basis. I wonder what became of that large D. Thomas family.

"Those wooden tubs were pretty good too. You could bolt on the mechanism direct, and they had fine insulating qualities. However, they would dry out and leak. Then we went to copper tubs. They were water tight and looked good, but had to be handled like eggshells. Once they got bumped, Mrs. Chiseler was after a big discount, and Mr. Dealer had a headache. Then came all kinds of tubs, galvanized and hot dipped steel, electroplated steel, drawn aluminum, drawn combinations, steel and copper and cast aluminum. They all had their points, including some bad ones. We learned some very swell music lessons, including the one on Electrolysis of wash water. Some very funny things happened — that is, they are funny now — at the time they were a real pain.

"Well, along came porcelain enamel. It didn't come in its present form — far from it. The pioneers, Art Peters, Silas Altorfer and Terry Craig didn't put on any Houdini act. In the beginning, it was more like a Donnybrook Fair — fights of all kinds. I wish I had the money that warped and chipped tubs cost.

The future of porcelain enamel

"But porcelain enamel really won out. The scientific dudes did their stuff. They increased the ductility of iron about 500%. Tricks of heat-treating iron involving exact temperature cycles extending over scores of hours are trade secrets they learned the hard way. Today they are using this knowledge to make steel shell cases for our Army, a welcome substitute for vital copper. The ceramic sharks did an equally impressive job. I don't know where they found the glue that they mix with the porcelain to make it stick — but stick it does, even under abuse that makes me shudder.

"Porcelain enamel for washers, in my opinion, is not likely to be discarded in the near future evolution. It has done a real job for the manufacturer, the dealer and the housewife. By the way, the housewife really likes porcelain enamel. It cleans up well and looks nice, so that's the best reason."

How about new materials?

In conclusion, Mr. Woodin says: "Sure, we'll have new materials, including plastics, powdered metal parts, new finishes, etc., all in due time, but that wonderful new dream washer, built of all new and strange materials, operating on a new hocus-pocus principle, that's the bunk. This washing machine business is not as easy as it may appear. That music lesson has cost plenty of heavy money, and I suppose the old Schoolmaster Experience is now due for another pay-off. However, to paraphrase, 'When better washers are built, they will have familiar name-plates.' "

Our job

It would be difficult to present a better case for porcelain enamel than is presented here by a man outside the enameling industry. Our job now is to take advantage of every advancement in fabrication and enameling processes, and then keep such men as Mr. Woodin and the product manufacturers informed of this progress, in order to retain this high regard.

Advancements *are* being made and will be ready to assist the product manufacturer.

Dana Chase

Editor and Publisher

One of Inland's mills cold reducing enam iron strip which will later be cut into

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Blasted hardened steel rolls give Inland Enameling Sheets a special "texturized" surface—and to assure uniformity of surface, rolls are frequently changed.

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Write for Bulletin

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The spotlight turns on kitchens

By Margaret Davidson • DIRECTOR OF HOME ECONOMICS
EDISON GENERAL ELECTRIC APPLIANCE COMPANY, CHICAGO, ILL.

Exclusive feature finish

In millions of American homes the kitchen is the stage and the homemaker the featured player in a very real drama. A new chapter of this kitchen story unfolds daily; as the curtain rises in the morning, whiffs of coffee greet the family — the audience to the drama — and announce the day has begun. The curtain closes as the last night-owl sneaks into the kitchen for a midnight snack to tide him over until another breakfast. Between curtains there are three high spots of action, centering around breakfast, lunch and dinner time. Day in and day out the story is repeated — with variations, of course.

Some people who have puffed hard and long at their dream pipes, and had the visions associated therewith, have implied that in the future woman's role in this drama is due to become "chief button pusher." You would almost believe, after hearing some of the forecasts for the future, that preparing a meal, for instance, would be reduced to setting a dial and pushing an appropriate button. But blow away the smoke from the pipe dreams, and what we see is something different.

No "button pusher" kitchens in sight

In the first place, there are no immediate indications of wizard-like appliances that at the flick of a switch will take over one hundred per cent the operation of the household. In the second place, women still prefer to have the "say-so" about the kind and quality of meals they set forth for their family. No one, not even the most ardent kitchen enthusiast, will ever claim that all women love to plan and cook meals. But everyone will agree that all homemakers are delighted when the drudgery end of kitchen work is eased.

On this score the future does look rosy. Kitchen appliances, the supporting cast to the homemaker's star role, have been vastly improved. Kitchen work is easier, is cleaner, is time-saving — and the results are improved, too — because the ranges, refrigerators, dishwashers, have been precision-built, and include automatic features that take over much of the tedious responsibility. Compared with our grandmother's setup, running water in the kitchen — particularly hot running water — is a great boon. Who will ever forget, on an early visit to "grandmother's house," the whining squeak that announced that some early riser was out hand-shaking the pump handle and bringing in the water to start the day's work? So, with easy-to-use appliances women today have an advantage. The future holds improvements over the very good appliances we know today.

Kitchens that "just growed"

The next step in a kitchen-betterment program is to arrange the appliances so the work moves smoothly and easily with a minimum of waste effort. Paradoxically, in view of the importance of the kitchen, most women are not too familiar with — or articulate about—the actual arrangement that will give them easy workability and satisfaction. That is logical, in the face of the facts. The majority of today's kitchens — like Topsy — just growed. Very often the space assigned to a kitchen was what was left after the rest of the house was laid out. Consequently many kitchens have wall spaces interrupted by poorly placed doors and windows. Then, too, homemakers are busy people who are heckled by many interruptions. The burden of proof for them is to get the work done — and seldom do they have the time and temper to settle down for a "what's-the-matter-with-this-kitchen-session" with themselves. It's like driving a car, they know how to get from here to there and back again — but when something goes wrong they can't always put their fingers on the trouble.

The three work centers

Kitcheneers who with stop watches and measuring tapes have charted women's cross-kitchen treks as they work, have come forth with basic

Margaret Davidson

Miss Davidson, before becoming director of home economics at Edison G.E., was household editor, "Ladies Home Journal." Previous to that, she was director of home economics, Cleveland Illuminating Company, and before that was a staff member of "Delineator." She received her home economics training at Iowa State College.

A modern kitchen in the good old pump handle days.

principles for laying out good, workable kitchens. The work in a kitchen moves around three major centers, each of them featuring one of the three major appliances — the range, the refrigerator and the sink (perhaps with garbage disposal and dishwasher). Not one of these working centers is complete until storage and working space are provided as a part of the unit.

The Cooking Center spotlights the range where foods are cooked and hot foods served. The Storage and Mixing Center is built around the refrigerator. Because many of the ingredients that go into the making of cakes, pies, breads, casserole dishes, salads, desserts and the like require refrigeration, it is advisable to plan space for these activities and storage for the necessary supplies near the refrigerator. However, should this plan not prove feasible in a given arrangement, an alternate is to plan for a general food preparation area near the range. The third of the main kitchen work areas is the Dishwashing Center where dishes are washed and dried and many fruits and vegetables are prepared.

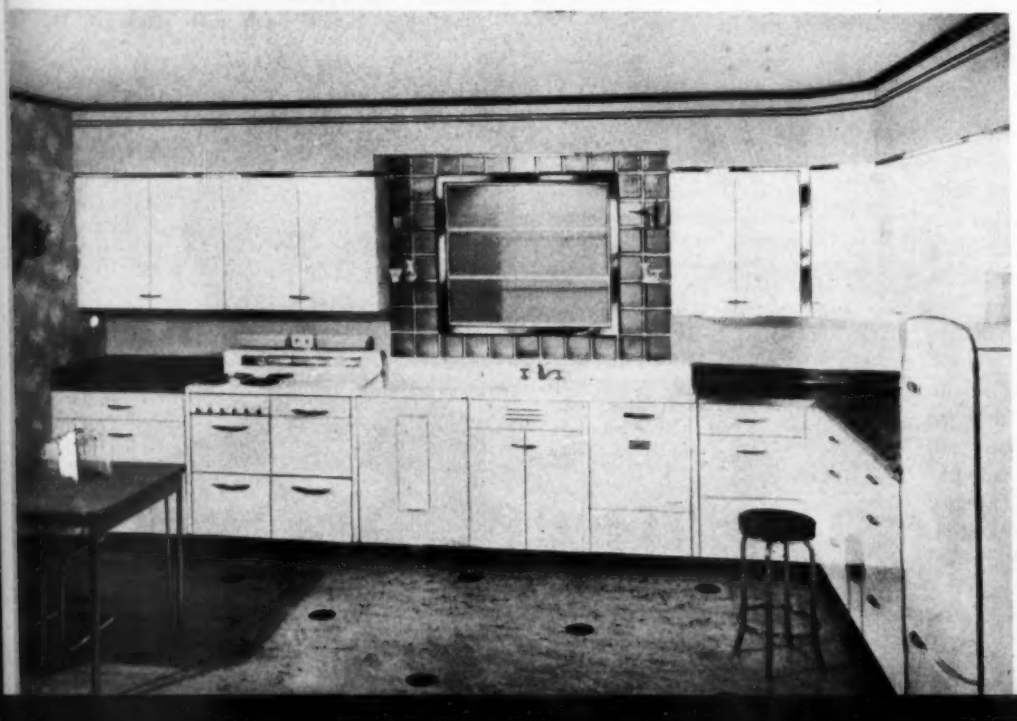
The most workable scheme for grouping this work center is to place the dishwashing center between the cooking and the preservation-preparation area, because water is used both at the range and near the refrigerator. Then, too, this centered spot for the sink makes a very strategic place to collect the inevitable soiled dishes that accumulate in kitchen work.

So that hot foods can be served really hot, smart kitchen planners place the range near the door to the dining room. Because most food supplies are brought in through the rear door, it's a good plan to have the refrigerator near the back entrance. Most women are right-handed — and for them the best plan usually is to arrange the sequence so work moves from right to left.

The "U", "L," and "Aisle" kitchens

With these simple basic ideas in mind, kitchen planning is reduced to its essentials. Kitchens designed for convenience usually take one of three forms: They are U-shape with the sink in the center, the range on one side and the refrigerator on the other; they are L-shape, again with the sink near the midpoint of the working space; or they are aisle-shape with one working center along one wall and the other two along the opposite wall. But whatever the final shape may be, it's well to consider the kitchen in relation to the rest of the house — and plan it so as few people as possible dash through the "business" part of the kitchen to interrupt the homemaker at work.

Many kitchens are actually the hub around which the home activity turns. In addition to facilities for cooking the family meals, many women have said they want a spot where meals can be served in or near the kitchen. Here the family can gather informally, the children can eat lunches and



Even the top photo on this page is a big improvement from "grandmother's house" when "the whining squeak" of the pump handle announced an early riser . . . It is a far greater step in the kitchen-betterment program when we view the photograph at the left showing the time and labor-saving conveniences that are expected today — and that were available before the war.

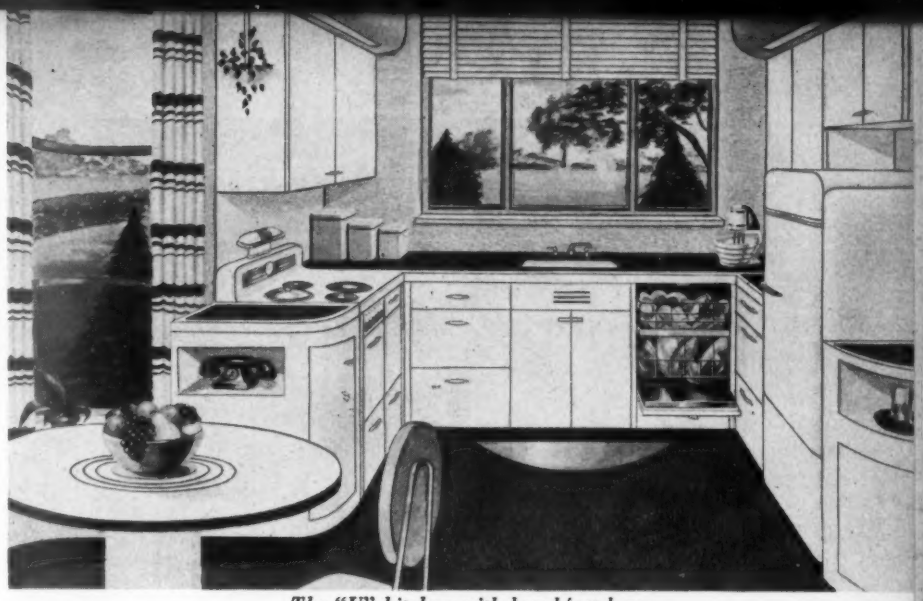
guests can enjoy a late evening snack. Other women, appreciating the convenience of doing the washing on the first floor, are considering a laundry layout in or adjacent to the kitchen. Automatic washing machines fit neatly into these plans. With the growing scope of activity, the trend is away from tight, little, efficiency kitchens into more open ones that have room for these other activities.

The "double standard" in kitchens

Kitchens that are truly satisfying are more than efficiency rooms — they have personality and attractive appeal as well. Ask any woman and she will admit to having a double standard for her own kitchen. True, she wants it an easy place to work in and a time-saving one to keep attractive. But beyond that she wants *her* kitchen to have charm and an attractive appearance.

There is real pleasure in working in a room where color and decorative ideas have been included as well as efficiency layouts. In a recent large poll, white was preferred for appliances and kitchen cabinets — and no wonder! White cabinets and appliances make a perfect background for whatever decorative scheme is desired — and furthermore, the white background is timeless and not quickly outmoded. Hard-finished white surfaces are easy to keep clean and attractive. Color can be introduced in walls and floors, in interesting curtains at windows, in flowers or herbs, in colorful pictures and prints — (in kitchenware and accessories) —these and other such ideas bring a "plus" to a kitchen in much the same way that a feather adds interest to a hat. They make a kitchen really belong to the woman who works in it.

All over the country people are planning now for kitchens they will build or remodel in after-war days. Come the time the kitchen blue prints being made today are translated into reality, women will revel in the rooms that will weave together the two themes — modern labor-saving convenience and completely livable charm. Against the backdrop of these rooms, homemakers can be truly prima donnas.



The "U" kitchen with breakfast bay.

The "L" kitchen with breakfast alcove.

An "Aisle" kitchen with a snack bar.

Identification display
should be part of store front design

By Maxwell M. Freeman • MANAGING EDITOR, MODERN STORES

This article is from the book "Modern Stores" (The store modernizing manual of the National Retail Furniture Association). It is one of a long list of articles by leading authorities on the subjects of store location, store fronts, windows, interior design, department displays, lighting and color. While the articles in this book are directed primarily to the furniture dealer, there should be much of interest for any retail merchant. Finish suggests that enamelers interested in architectural porcelain obtain a copy of this book before the supply is exhausted and study the expressions of leading architects and designers.

The drawing below incorporates the elements of good name and display identification, with name sign above the marquee, name of store repeated for close-up visibility, and feature panels placed to be seen from either direction of approach — also illuminated store entrances.

ILLUSTRATIONS COURTESY FEDERAL ELECTRIC COMPANY.

CERTAIN trends are developing in retail store identification displays which should be incorporated closely in your modernizing plans. The most attractive store front, the best planned window displays, and the most carefully planned store interior will fall short if your store is not easily identified by prospects passing your location on foot or by car. They may not have time to stop and see your displays or to read your window display messages, but if they can see your identification sign without having to stop, without having to make an effort to read your message, they'll come back to it.

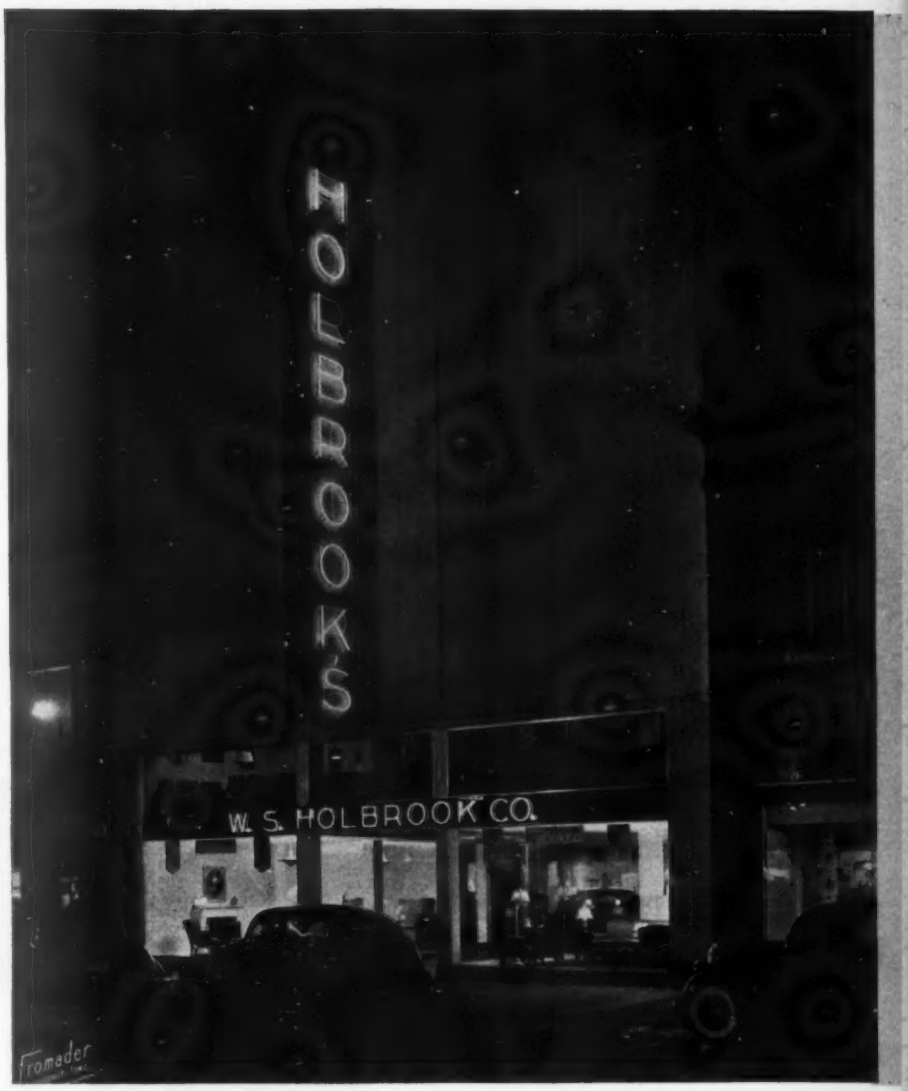
Individualization of the store name or of the store service is the prime function of identification displays. Your display is an advertising medium of its own. It does not take the place of your other advertising, but by the same token, another advertising medium can not do the work of your identification display. It heads the list of your point-of-sale advertising.

Make sign consistent

If you are going to modernize and if you plan to use identification display, make this display an integral part of your store front scheme. Give your architect the go-ahead to collaborate with the sign manufacturer in incorporating a sign consistent with the store front design. In this way your identification display will be given its proper place in the overall plan, which will make it far more effective than if you were to plan on throwing the sign in later — like hanging out an after-thought.

Prospective buyers of store front display signs will do well to bring the representative manufacturer into the design consultation. He has at disposal the facilities and the staff with which to advise you about local sign conditions, how yours can fit in competitively, about the visibility, the effect, what type or size would be most adequate and most economical.

Among recent and comparatively new developments in identification display is the use of animation. This is not to be mistaken for neon-tubing flash-type display. Animation is an advancement over this type of display — the effect is achieved through a mechanical process, rather than through a tubing process. It has a fascinating appeal and tends to hold attention longer than other types of signs.



Alternate flash-sign, showing store name and word "furniture" in background. The horizontal sign is on black enamel background. In windows above the sign, merchandise is displayed for visibility from across the street.

"Special offer" panels are gaining in popularity. They give you the opportunity to offer featured merchandise as tie-ins with your nationally branded merchandise, with your special sales, with your windows, or with your special interior department displays. Special offer panels are a take-off on marquee type of advertising, the success of which has been proven. They give your identification display an added effect through interchangeability.

There has been as much talk of radically new developments in the sign lighting field as in other fields. As a result of the war, however, the most applicable and effective developments are simply new applications of old materials. Architectural plaster, neon tubing, flood-lighting, and silhouetting — all these have been in use a good many years, but it is just recently that new applications for these materials have been developed. Silhouette display will probably re-

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SNAPSHOTS AT WASHER-IRONER MEETING

(reported in February Finish)

TOP: Left — W. Neal Gallagher, Automatic Washer Co. Right — B. J. Hank, Conlon Corporation, treasurer of the American Washer & Ironer Association.

CENTER: Left — Wm. Shaw, publicity director for A.W.I.A. Right — W. V. Brumbaugh, who will head the Washington office, and A. H. Noelke, executive secretary of the Association.

BOTTOM: Left to right — Fred Maytag II, Maytag Company; E. C. Buchanan, Holland-Reiger, Sandusky, Ohio; and Roy A. Bradt, Maytag Company.

FINISHFOTOS

A suggestion for relief from scumming in antimony-free enamels

based on a one-year study in a production stove plant

By A. Lander • ENAMEL TECHNICIAN, AND

L. Lodestro • ENAMEL CONTROL, CRIBBEN AND SEXTON COMPANY, CHICAGO, ILLINOIS

finish

It seems likely that every enameler who has run antimony-free enamels in production has at some time or other encountered scumming on ware that has been allowed to set over a period of time in the bisque.

We have been using some antimony-free enamels since they were first introduced by the commercial frit manufacturers, and we have now used them exclusively for over a year.

Scumming, the only drawback

We soon found that on ware that was allowed to set over night there was a decided tendency toward scumming of the finished ware. This was particularly noticeable on the sections of pieces nearest the top of the furnace. We found one part in particular which always seemed to show the worst tendency to scum. This was a small door handle. While gauge or shape may have had something to do with this scumming, another point was that these handles were always fired on top of the burning tools.

The formula we were using at the time was:

Formula "A"

Antimony-Free Frit	100 lb.
Clay	7½ lb.
Opacifier	2 lb.
Sodium Nitrite	3 oz.
Potassium Carbonate	4 oz.

After working with the antimony-free enamels over a period of months we became thoroughly sold on their use from two standpoints — high covering power and workability. We had inaugurated a one-coat program in our plant and this type of enamel gave us our first opportunity to make this program click.

On the other hand, it was not *always* practical to fire all cover coat immediately after drying the sprayed ware, and it soon became evident that we would have to do something to lick the tendency to scum if we were to get the most out of this type of enamel.

Practical shop study started to determine cause

We knew that the laboratories of the frit producers were working on this problem and felt that parallel work in our shop would supply the opportunity to check results under production conditions.

With this in mind we started a series of tests. Our first work was with frits from various sources. While some variation was found in the different enamels, the results did not point to a final answer to the problem.

Following this we worked with a number of different blends of clays. Here again we were able to get improvement with certain blends, but not the answer.

Opacifiers came next on our list for checking, and we even went so far as to make up formulas with deionized water to see if our water source might have an effect.

We should, perhaps, mention the fact that before this testing was done our furnace was carefully checked to make sure that the atmospheric conditions were satisfactory.

Our tests also included variations in fineness of milling, specific gravities and drying conditions.

From all of this work we arrived at certain formulas and combinations of materials that showed a minimum of scumming under production conditions, but none that provided the answer for which we were searching.

Accidental discovery

One morning we noticed that several racks of back splashers had been allowed to set overnight in the bisque. Our first reaction was to wash these off and re-spray them before firing, as we took for granted they would show scum after setting for this period of time. However, we decided to run a few pieces through just to see what would happen. Much to our surprise when these came out of the furnace they showed an excellent luster and no tendency whatsoever to scum.

We immediately checked the formula and found that the back splashers were re-sprayed ware. The enamel used had been made up according to the following formula:

Formula "B"

Antimony-Free Frit	100 lb.
Clay	7½ lb.
Opacifier	0
Sodium Nitrite	0
Potassium Carbonate	4 oz.
*Blue Oxide	1 oz.

** The blue oxide was a color stabilizer to correct the color in the re-sprayed work and give us a match with one-coat ware.*

The results of this chance testing pointed to the blue stabilizing oxide as the material affecting the results. We did not know the composition of the oxide, but felt that there was a possibility that zinc oxide might have been used as a fluxing agent.

Experiments with zinc oxide

A series of tests were started in which zinc oxide was used to check

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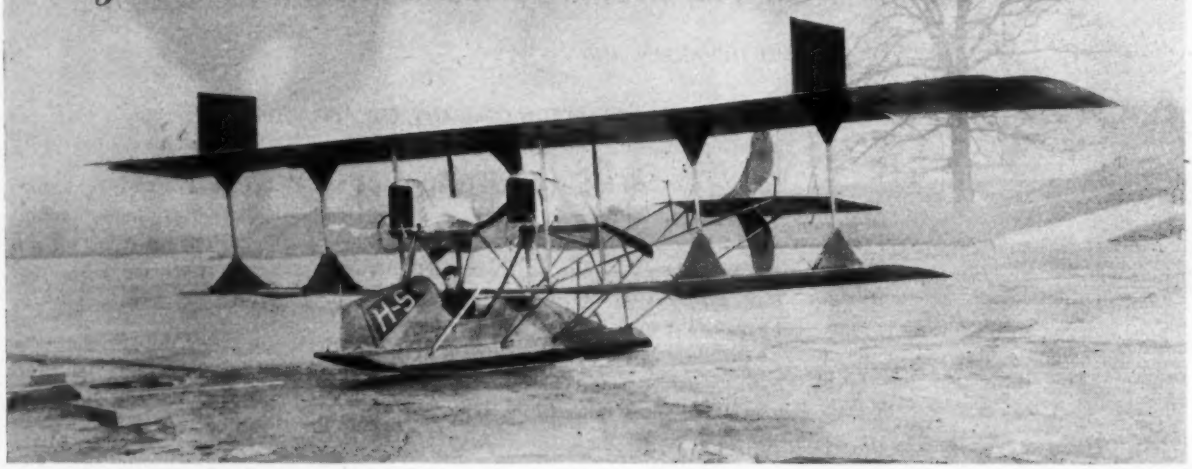
Prototype of first Robot Bomber

built by Mullins 29 years ago

By Gaither Littrell • WESTERN EDITOR OF "FLYING"



TO Robert Modisette, technical expert and chief of the contract termination group at Consolidated Vultee Aircraft Corporation, Vultee Field Division, Downey, California, there is nothing new in the theory of airplanes of the self-flying type, except radio. For it was Modisette who, back in 1916, built and flew what is believed to be the first plane of that kind.

Modisette developed the self-flying plane when he was vice president of the Mullins Manufacturing Company of Salem, Ohio.

"It was my belief at that time that airplanes had an extremely important future in military usage, so we started designing them," Modisette relates. "We were especially interested in producing training planes for would-be pilots — at that time there was nothing but the finished combat plane."

Mullins first venture in this new field was a training aid that resembles the present day Link Trainer. Next came an advanced "semi-flying" trainer that could rise only six feet off the ground. Finally they developed a full-sized, twin-engined biplane that really could get up in the air and cruise for miles.

It was from this plane that the self-flying bomber was developed.

Four such pilotless planes were loaded with practice bombs, flown to their targets, and disintegrated by release of the bomb load in an exhibition staged for United States Navy officers in July, August and September of 1917. Success of the demonstrations resulted in preliminary negotiations of the Mullins Company with the Navy for mass production. The Armistice put a stop to the project however.

Modisette, whose inventive talent has currently been put to use by Consolidated Vultee in following up suggestions made by employees for a speed-up in producing Liberator bombers and other projects, became a Navy flyer at the time the self-flying plane was first developed and demonstrated for the Navy.

He called his bomber creation the "Hot Shot."

The "Hot Shot" was built of scrap spruce, rejected airplane cloth and dope at a total cost of $452. Its prototype, the orthodox trainer regularly sold by the Mullins firm to pilots and flying schools had cost $2,450 to build nearly two years earlier.

The "Hot Shot" had a wingspread of 46 feet and measured 19 ft. 8 in. from nose to tail. Unloaded, it weighed 1,790 pounds and carried three bombs weighing 65 pounds each. It was powered with two Ford automobile engines that mechanics had "hopped up." It had a maximum speed of 72 m.p.h. at a ceiling of 1,500 feet. Cruising range was 160 miles.

When the plane released its bombs, it fell apart in mid-air and hurtled in pieces down upon what would be enemy troops. This disintegration was planned so that the enemy could not reload it and send bombs back to the owners.

The principle of the plane is explained by Modisette as follows:

An exhaust turbo and air impeller were connected to the exhaust ports of the engines on the same shaft. The turbo was turned by the force of the exhaust. From the impeller, the air was forced into an accumulator and through this to a pendulum air and relief valve and, when the air line was open, through this pendulum air valve to an air rotor.

A worm was cut directly into the end of the air rotor shaft. The worm gear meshing with the worm reduced the speed of the actuating screw. A thread was cut on the worm gear shaft which went through a swiveling unit attached to the end of each aileron, thus the function of the pen-

dulum air valve in opening or shutting off the air line acted upon the aileron; under all conditions the pendulum air valve remained in a position perpendicular to the surface of the earth — despite the airplane's banking to port or starboard.

When the "Hot Shot" banked, the air valve opened and, through the air rotor, the action of the worm drive automatically forced the ailerons into a position which brought the ship back into level flight.

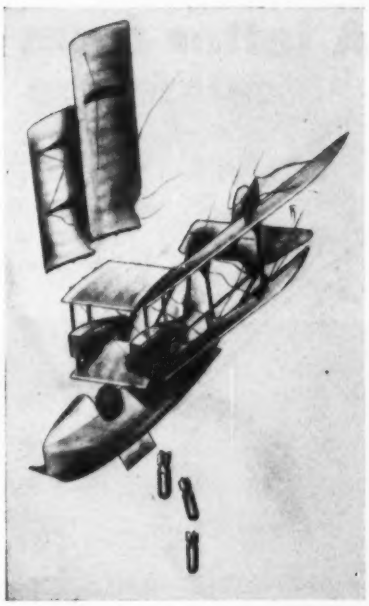
The take-off, climb and leveling off processes were equally simple.

From the accumulator, an air line was run to the elevator and to the bomb release gear. Before the take-off, the elevator was set and locked in a position so that the bomber would gain a given altitude in a predetermined length of time. A mechanical timing device actuated by an air valve was attached to the air lines and, when the plane reached its altitude, the timing device opened the air valve which forced the geared elevator into a position bringing the airplane into level flight.

The timing for the bomb release gear was set so that upon elapse of a given time interval the bomber theoretically was over the target area, the distance of which had been carefully estimated. At that moment an air valve tripped the bomb release mechanism, the bomb bay doors were forced open and the bombs were released.

The bomb bay doors were connected by wires to three pins in each wing, upper and lower, port and starboard. These pins were placed in joints which joined the center sections and outer wings together. The opening of the bomb bay doors pulled the pins out of their fittings, the wings folded upward, and the airplane hurtled earthward like a disjointed goose, following its bombs down upon a startled enemy — a theoretical enemy, that is.

On one of the four tests for the Navy, Modisette said the timing mechanism — which he described as "nothing more than an accurate clock with a few improvisations" — was set for a 90 mile flight. The target was not hit squarely because of an unexpected change in wind, but bombs — and the plane — fell in "the general area," the designer declared.



Naval tests in 1917 established the Modisette plane's ability to drop bombs and then destroy itself by dropping off the wings. Final experiments on the plane were abandoned when the war ended. Four flying models had been constructed.

An artists conception of the consternation which would result along the German front when the "Hot Shot" descended upon them. Three 65 pound bombs would be dropped, the wings fall off, and the ship crash to earth.

ILLUSTRATIONS COURTESY "FLYING"

The other three demonstrations were more successful because of the shorter distances and "were almost right on the bull's eye," he claims.

Today, scientists are expanding tens of thousands of dollars to perfect remote-controlled bombing planes. Modisette firmly, but modestly, believes that some consideration might be given to the theory he and the Mullins Company put in practice 28 years ago, now that scientific developments are advanced to make his principle even more simple and inexpensive.

Since the jet bomb, most unorthodox of Nazi war weapons, is little more than a winged, long-range artillery shell, Modisette's argument seems to have point. Inaccuracy of the jet bomb might well be circumvented through radio control of a pilotless bomber.

A letter from Greenland . . .

Lieutenant D. B. Walters

Editor's Note:

Finish receives many letters from executives and plant men within the industry, from those with allied interests and quite a few from service men formerly associated with the enameling field. The letter reproduced here has a very special place in our comment file. It was written by Lt. D. B. (Bud) Walters who enlisted in the U. S. Army in 1940. Naturally, we value the letter for its splendid comment in regard to Finish, but we believe the remainder of the letter should have general interest to our readers for its vivid description and candid comment.

Lt. Walters is a son of the late D. B. (Dur) Walters, former vice president and general manager of Chicago Vitreous Enamel Product Company — a man who was well known throughout the enamel industry.

Greenland
——— 26, 1944

"Dear Dana:

"Thought I would come out of hibernation and pay a short visit. I trust all is well in Chicago, tho I can imagine you have been extremely busy with the new publication.

"Congratulations on "*finish*," Dana. I believe you have a real contribution to the industry with your journal. Your statement on "*finish's*" mission covered it well. Let me toss a bouquet for the layout, writing style and pictorial features. It's mighty pleasant reading. Guess you never heard of the old business axiom which dictates all industrial journals into the conventional, musty compilations which read as easily as a pharmacopoeia — thank the Lord. A business man must feel that he is among old cohorts, meeting new ones, and receiving the latest developments and swapping information on his favorite topic.

"During the long winter months of infrequent contact with the outside world I found myself wondering what Mother would have to report next in your struggle for paper. I certainly am glad it all came out "in the wash." I'd really like to be on your mailing list for I whole-heartedly enjoyed the first issues — felt like I was among old friends (a grand feeling here in the Arctic) and was surprised to find only a rare few individuals whom I hadn't at least heard about. Mother has faithfully promised to relay any copies she receives, so the important thing is that they finally arrive.

"Now we are in the season of the midnight sun and I must admit it's a vast improvement over December when we experienced the mid-day night. Our mission here is absolutely a taboo subject — XXXXXXXXXXXXXXXXXXXXXXX

"The country is rugged, barren, and awe inspiring. My jaw dropped with amazement at first sight of the majestic fjords, great ice-caps, and mountains. It still drops — only now I fear with boredom. Isolation is a peculiar phenomenon and the elements and terrain here are kind by comparison. With characteristic wit the men have a prescribed remedy surpassing any medical treatment. The treatment: 'Five minutes in the shade of a tree.' (The highest bit of vegetation in all of Greenland is not waist high.) A *short* tour of duty in Greenland would be like a visit to vacationland. The skiing has been wonderful and lasted until the latter part of May. Twenty to forty pound cod and salmon practically knock noses in our fjord. One could never forget the breath-taking displays of the Great Northern Lights, the vast ice packs, and fields of icebergs — or the great blizzards and winds surpassing a hundred miles an hour.

"Naturally everyone's thoughts and prayers are with the forces now assaulting the Continent. We follow the progress carefully from our 'refrigerated foxhole' and listen to B.B.C. and Berlin daily. The British are doing a wonderful job of newscasting. Nightly they feature recordings made on the spot in Normandy. In reporting they do little to 'soften' the news. By comparison most American commentators serve pre-digested baby cereal. Strangely, Berlin does our best propaganda work. They simply fail to understand American minds. Programs and commentators obviously attempting to discourage the American soldier have 100 per cent reverse 'English.' If we were heading for action in 30 minutes, I would use ten of them to listen to a typical program. I know the men would be more solidified and fighting mad than after any pep talk we could give."

(signed) Bud

NOTE: This letter gives no information concerning the present location or activity of the writer. It was written many weeks ago and its author has since returned to the States and has another assignment.

The value of standard tests to enamelers

systematic testing before, during, and after the enameling operation

By F. A. Petersen • SPECIAL RESEARCH ASSISTANT PROFESSOR, UNIVERSITY OF ILLINOIS

DURING the past few years, enameling plants have been used for a great variety of work other than enameling. Heat treating, metal stamping, and fabrication of bombs, shells, plane parts, and a host of other jobs have been carried out very successfully by the enameling industry. During the period of converting plants to do these jobs, the enameler learned a great deal about working to dimensional specifications, and the necessity for checking materials and finished parts, so that the specifications could be met.

When the time for reconversion to normal enameling operations draws closer, the industry can profit from its wartime experience by the application of testing procedures to a greater extent in the enamel shop.

Many of the larger plants have seen the value in having a program set up for process control and product testing, and the benefits which can be derived from a program of this kind.

Tests which are used in the enameling industry can be divided into three groups:

1. *Material testing*
2. *Process control testing*
3. *Products testing*

Some tests have been standardized and give comparable results when run in different plants by various operators. Other tests have been developed within individual plants and the testing procedures differ from those used by others, and these results are not comparable from one plant to another. It is of much greater value to have some tests used in the plant, even if they are not standard, than to have standard tests which will not be used.

The best test in the world is of no value whatsoever if it is not used. In order that a test be usable it must be:

1. *Simple to run*
2. *Obtain results in a short time*
3. *Give results which are usable.*

If it meets these specifications, it will be used and standard tests can be set up which will meet these requirements.

Material testing

In most cases the enamelers are not directly concerned with material testing, unless they make their own frits. Even in these cases, the chemical suppliers will furnish chemical analyses of the materials used. The companies which produce frit commercially have done a very good job in setting up complete chemical laboratories in their plants, so that analyses can be made in order that no substandard materials enter the frit batch. Clay processors and oxide manufacturers also make every effort to be sure a reliable, uniform product is produced.

In some plants the steel used is tested periodically to be certain that it meets specifications. Smaller plants are not equipped to run these tests, except possibly the sag test, but the data, however, can be obtained from the steel supplier.

Control tests

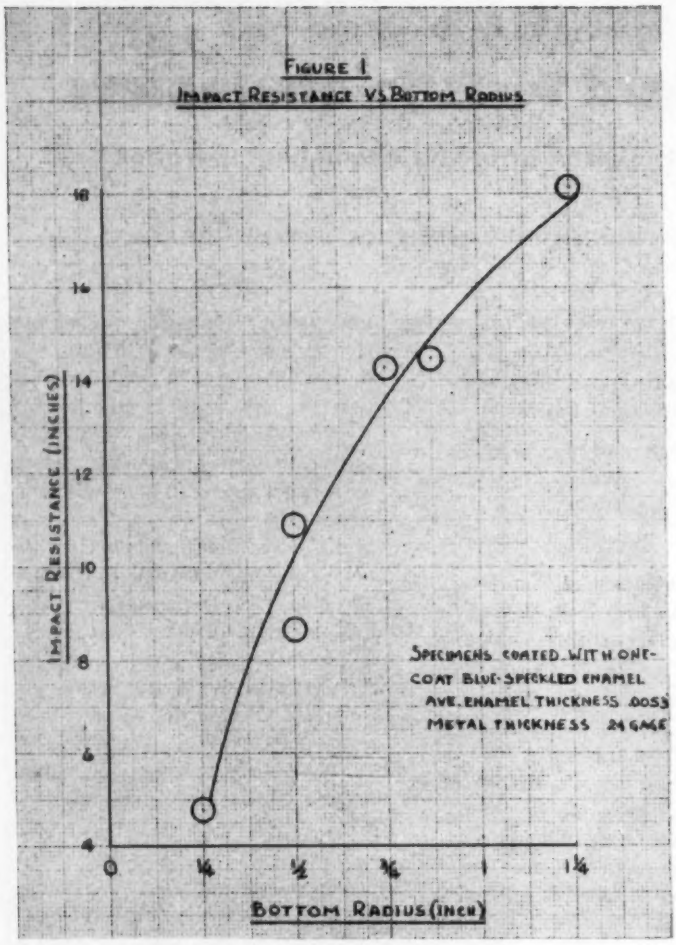
Control tests have been used by the porcelain enameling industry to a varying extent for some years.

Everyone is familiar with the procedure used in the pickle room to determine the strength of the various solutions. It is very important to have complete control testing in the pickle room, including regulation of the length of time ware is kept in the solution as well as temperature of the solutions. Testing of this sort increases the possibility of having ware come from the pickle room in the same condition from day to day. The importance of complete pickle room control will increase with the introduction of one coat whites applied over the new steel. The procedure must be varied at times to take care of different types of steels and variation in the degree of drawing on the ware. However, the man in charge of the pickle room should make it his job to see that variations are made only when necessary, and the standard procedure should be returned to at the earliest opportunity.

A great many of the defects encountered in enameling can be traced to the pickle room, therefore it is very necessary and important that ware be cleaned properly before it is processed further. The pickle room control not only helps reduce rejects in the enamel shop, but it is possible to show a considerable saving in time and materials when the control testing is properly carried out.

The mill room is an important section of any enamel shop. The prime purpose of mill room control is to produce enamel slip for the enamel room which is uniform from one day to the next. Fundamentally all fineness tests are the same in that the degree of fineness of the enamel frit is being measured. There are innumerable variations in the method for determining and reporting the fineness of the enamel. In each individual plant the results obtained from one day to the next are relative to each other, if the same procedure is used. The testing of the fineness of the enamel is only a measure of one property of the slip.

For many years work has been done on various tests which measure the "set" of the enamel. The time honored test of dipping the fingers into the enamel slip, and observing how it runs off, is the test to be duplicated. As near as can be determined



the specific gravity, flow and the pickup of the enamel are the properties which chiefly measure "set." Tests using the mobilometer, or some form of consistometer, give the data for yield value and mobility which are a measure of "set" but the tests are too lengthy. The best combination of tests to evaluate this property is the determination of the specific gravity and the "pickup" of the slip. The "pickup" of a slip is determined by weighing the amount of enamel which adheres to a ground coated or pickled steel sheet which is dipped into the enamel and withdrawn. In order to duplicate the results from day to day, the tests should be made after the enamel has aged a definite period of time, since the "set" changes rapidly during the first 24

Figure 1 — shows the effect of variation in the bottom radius of test specimens on impact resistance. Specimens were coated with one coat blue speckled enamel, using 24 gauge metal and an average enamel thickness of .0053".

Figure 2 — charts the effect of metal thickness on impact resistance. Tests were made with standard 2-quart pudding pans. Enamels tested were: 1-coat ware, average thickness .0045"; 2-coat ware, average thickness .0119"; and 3-coat ware, average thickness .0167".

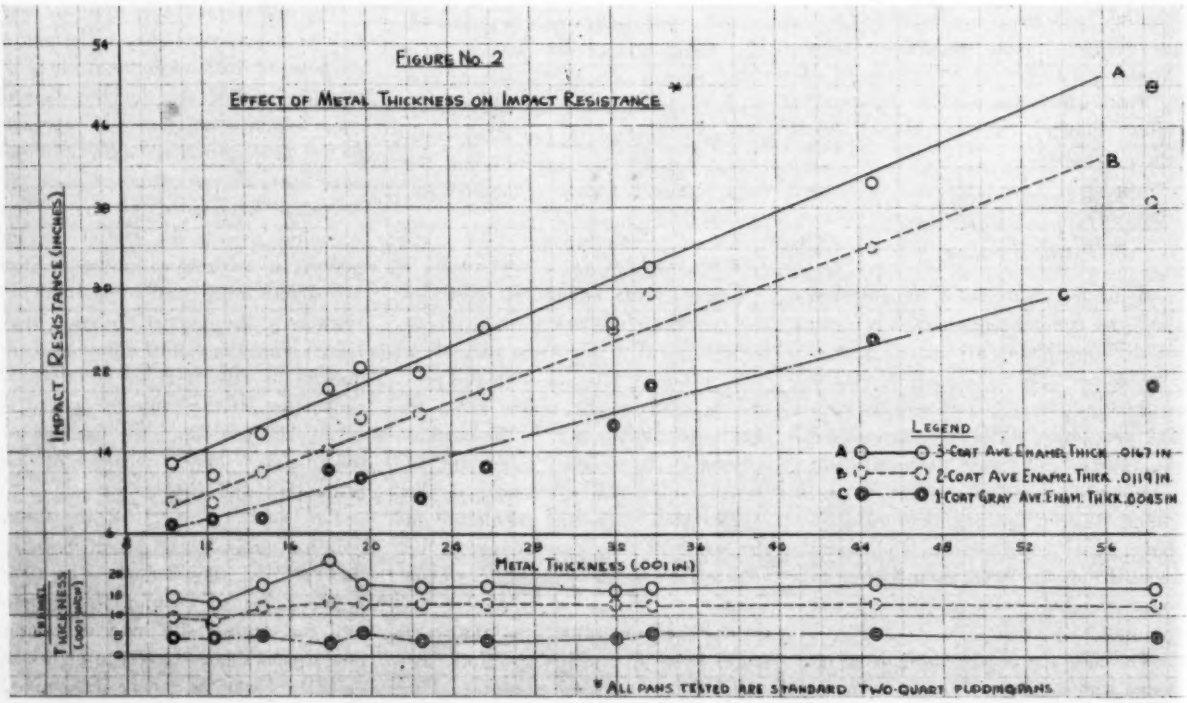


FIGURE NO. 2
EFFECT OF METAL THICKNESS ON IMPACT RESISTANCE *
IMPACT RESISTANCE (INCHES)
METAL THICKNESS (.001 IN.)
ENAMEL THICKNESS (.001 INCH)
LEGEND
A 3-COAT AVE. ENAMEL THICK. .0167 IN.
B 2-COAT AVE. ENAMEL THICK. .0119 IN.
C 1-COAT GRAY AVE. ENAM. THICK. .0045 IN.
* ALL PANS TESTED ARE STANDARD TWO-QUART PUDDING PANS

to 48 hours of aging. After the tests are run the slip can be brought to the desired condition by the addition of electrolytes and the adjustment of the water content or specific gravity. Some plants use a simple flow tube in conjunction with specific gravity determination and set up a table of flow times and gravities for various types of enamel.

In the enamel shop spray weights and dip weight determinations should be made at regular intervals during the day to assume uniform coating of the ware. Careful control of dip weights and spray weights, once the desired coating is determined, helps to markedly decrease the color matching problem. The most helpful test instrument available for use in the enamel shop is the thickness gauge. Careful, conscientious use of this instrument helps materially in decreasing assembly line losses and failures due to chippage after the completed unit is in the customer's home.

Product testing

In the field of product testing, the enameling industry as a group has fallen behind. The industry is at

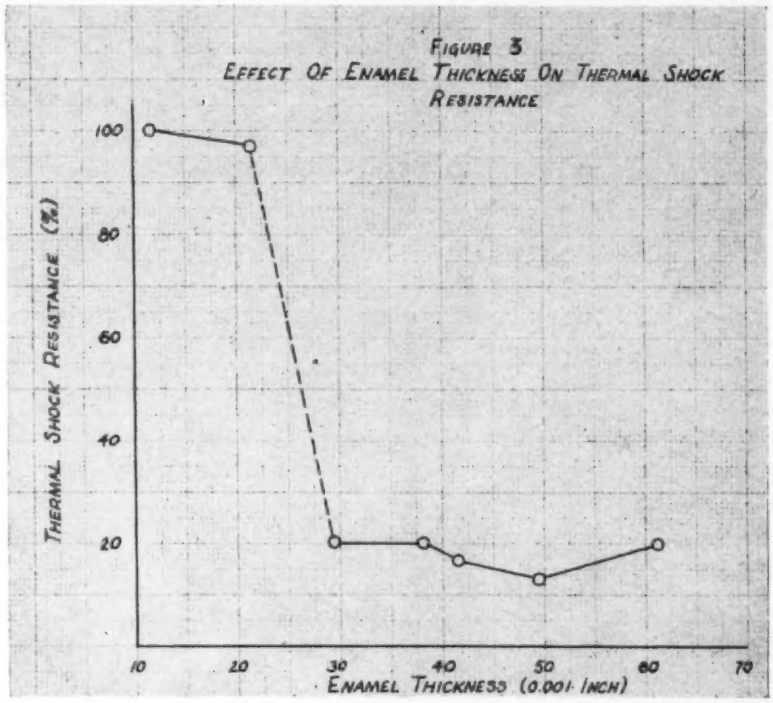
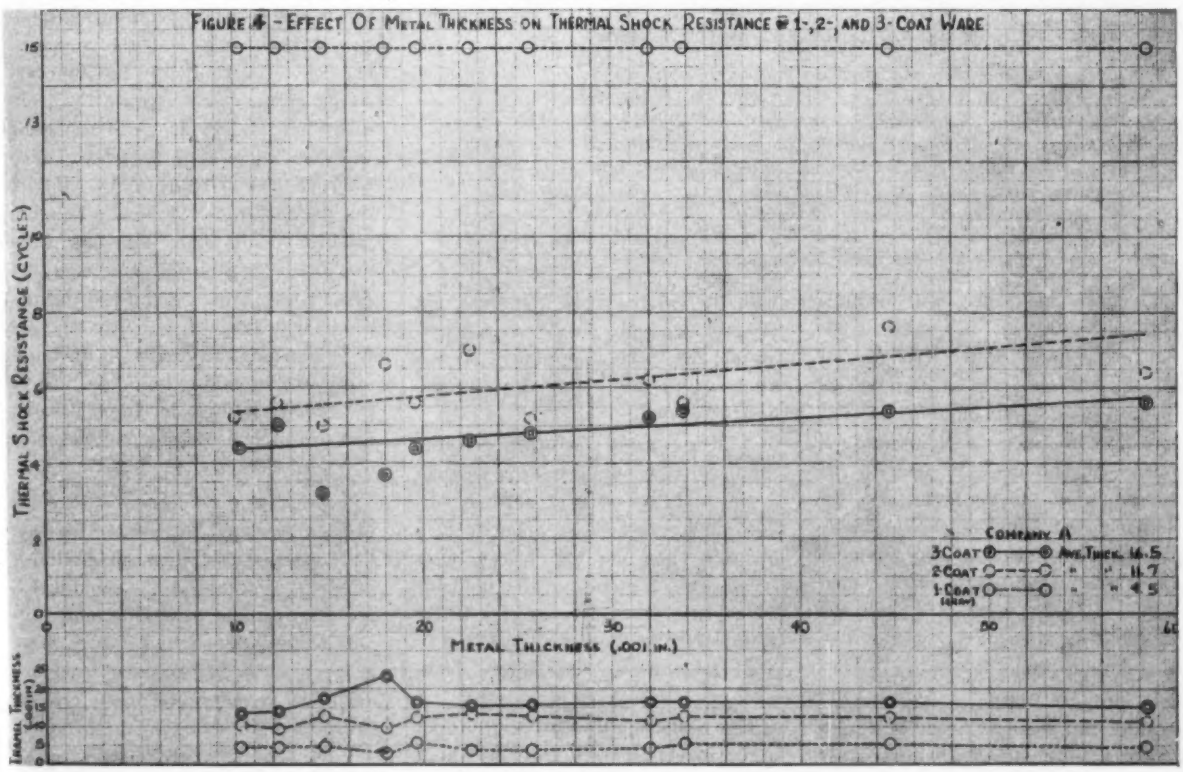


Figure 3 — plots thermal shock resistance in per cent against enamel thickness in .001". Notice the sharp drop in thermal shock resistance when enamels are applied above "normal" thickness.

Figure 4 — plots thermal shock resistance measured in cycles against metal thickness in .001" to show the effect of metal thickness on resistance to thermal shock.



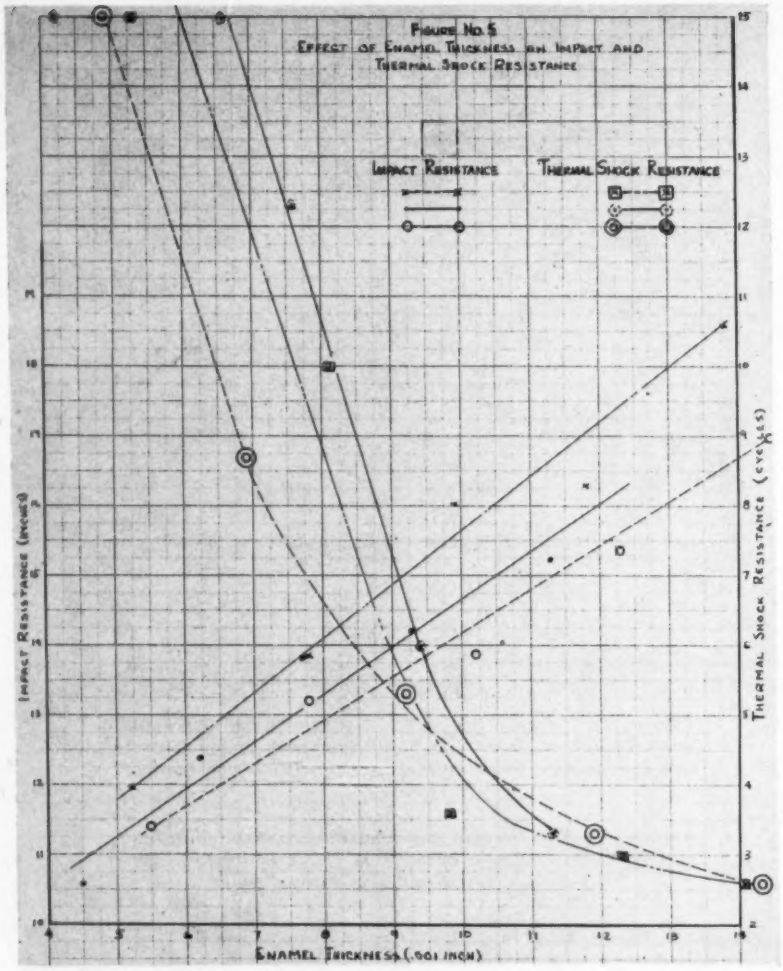


FIGURE NO. 5
EFFECT OF ENAMEL THICKNESS ON IMPACT AND THERMAL SHOCK RESISTANCE
IMPACT RESISTANCE
THERMAL SHOCK RESISTANCE
IMPACT RESISTANCE (INCHES)
THERMAL SHOCK RESISTANCE (CYCLES)
ENAMEL THICKNESS (.001 INCH)

Figure 5 — compares the effect of enamel thickness on both impact and thermal shock resistance. This chart shows the desirability of compromise for kitchenware enamels in order to get satisfactory resistance to both impact and thermal shock. It should be pointed out that the increase in impact resistance indicated applies to fabricated test parts which are rigid *as, for instance, the bottom radius of a pan. This same principle can not be safely applied to flatware where failure is usually due to strain or twisting. These parts need* thin *enamels.*

fault since there are test methods available and they do not take advantage of them. If the tests are not usable, others should be designed or changes should be made in them. The necessary changes can not and will not be made unless the men in the industry point out the faults. The development of practical and reliable product tests depend to a large extent upon cooperation between the men in the industry who must use the tests and the men in the laboratories who develop them.

In product testing it is quite important that the unit itself be tested rather than a sample plate, coated with the enamel used. This can not be done as easily on stoves, refrigerators, and other appliances as on kitchenware, unless the tests are nondestructive.

Acid resistance tests are possibly the most widely used tests in product testing. The spot test is easily carried out and the results are apparent at a glance. This one test has done a great deal of good for the industry by causing the wider use of acid resisting enamels especially on stove tops, table tops, and other places where acid resistance is necessary.

The reflectance test of finished ware, especially on reflectors where reflectance is of prime importance, should be used more. It is one thing to use an enamel that has a certain reflectance when applied to a plate at a specified thickness, but still another to produce a product which has a reflectance within a certain range. During the past few years a portable reflectometer has been available which is an accurate, yet rugged, instrument and is well suited to plant use.

The resistance of a porcelain enameled appliance to chipping is always brought up in discussions of product testing. I believe one of the best ways to determine the resistance of flat ware to this type of failure is the measurement of the enamel thickness. Some companies have set a maximum limit on thickness and have found that losses due to damage in shipment, assembly and use have been markedly reduced.

The kitchenware industry has set up three standard tests to be used in determining whether the ware meets specifications. These tests determine the resistance of the ware to boiling acid, impact, and thermal shock. The tests have been used in the industry for the past three years and the manufacturers have improved the quality of their ware. These standard tests have contributed to the improvements of the ware because the technical men in the plant can test their ware and determine just how much improvement is being made. Before the standard tests were made a manufacturer could state that his ware was better but he did not have any proof of it. Now he can see the improvement made from year to year by comparing the results on his latest ware with previous test data. These tests can be used as development tests, and are used in this manner by most of the manufacturers.

These tests do not complete the list of tests necessary for product testing. Other properties such as surface hardness or "wearability," "cleanability," and gloss should be studied and suitable tests designed to measure these properties. When suitable tests are available to determine these properties, it will be seen that the products

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Suggested layout

for a continuous furnace refrigerator liner plant

By A. B. Kimpel • ENGINEER, FERRO ENAMEL CORPORATION, CLEVELAND, OHIO

Exclusive feature finish

The layout illustrated is offered as a suggestion for the enameling of refrigerator liners and small miscellaneous refrigerator parts.

In designing this layout, the following items were considered:

1. Simplicity
2. Continuous Operation
3. Modern Practices
4. Compactness
5. Practicability
6. Economy

We believe one of the features of this layout is the simplicity of arrangement of the enameling equipment. The units are so placed that transfer points are of a minimum distance and the ware flows through the process without any back tracking.

Area "A"—Raw shape storage

This layout was designed with a premise that a new plant was involved and that the building could therefore be designed to suit the requirements for logical location of production and storage areas. Area "A" would be adjacent or at least convenient to fabrication.

In this setup raw shapes are delivered, preferably by conveyor, to the Storage Area conveniently situated near the loading area of the Continuous Pickling Machine. The conveyor can be so arranged that ware can be transferred direct or banked.

Area "B"—Pickled ware bank

Sufficient space has been provided to assure uninterrupted production for subsequent operations regardless of the production schedule for the continuous pickling unit.

Area "C"—Ground coat bank

Space is provided for the complete production of ground coated parts from one shift. Located as it is, adjacent to the feed conveyor for the finish coat spray room, loading time is minimized.

Area "D"—Brushing area

Brushing for the most part would be done on the conveyor line, but some additional space is provided for use as required. Direct transfer will tend to minimize damage of the dried bisque.

Area "E"—Mill room

The mill room is so planned that the mills are lined up along one of the walls and still far enough away to permit a walkway to enable the workers to manipulate the mill doors for loading and unloading. The mezzanine floor provides storage for frit, and agitated storage tanks for liquid enamel. A charging hopper is also suspended from an overhead monorail track for loading mills through charging holes in the floor. On the first floor two portable pumping units, one for ground coat and one for cover coat enamels, equipped with magnetic separators are used to pump the enamel to the storage tanks. Two Rotosprays combined with magnetic separators, suspended from an overhead track, receive the slip from the storage tanks, and empty into the pressure tanks.

It will be noted that the mill room is so located that it can supply the dip tanks and spray booths at relatively short distances, the ground coat slip being stored at the north end of the mill room and the cover coat stored at the south end.

Area "F"—Office and laboratory

Space has been allotted for office and laboratory and it might be mentioned here that enough can not be said regarding the importance of control work. The laboratory should be completely equipped with the necessary materials for quick and accurate control of the pickle room solutions and enamel slips, to warrant efficient operation.

Unit No. 1—Pickling equipment

The machine is of the standard type now successfully used in many enameling plants, which has proven itself very satisfactory not only from the standpoint of continuous operation but from the uniformity of the ware produced. The pickled ware can then be unloaded and hung directly on the ground coat spraying chain, or be placed on a roller type conveyor which feeds the Pickled Ware Bank, Ware ready for processing is then fed to the dip tanks or spraying chain.

Unit No. 2—Ground coat spray room

The ground coat spray unit consists of water wash spray booths enclosed in a room kept under pressure by supplying fresh filtered air which is conditioned by an air makeup chamber. This type of spray room is becoming very popular in that it eliminates spray booth exhaust units from picking up dirt laden air in the shop and passing it around the wet pieces. After the pieces are coated they are permitted to enter the dryer immediately.

Unit No. 3—Ground coat dryer

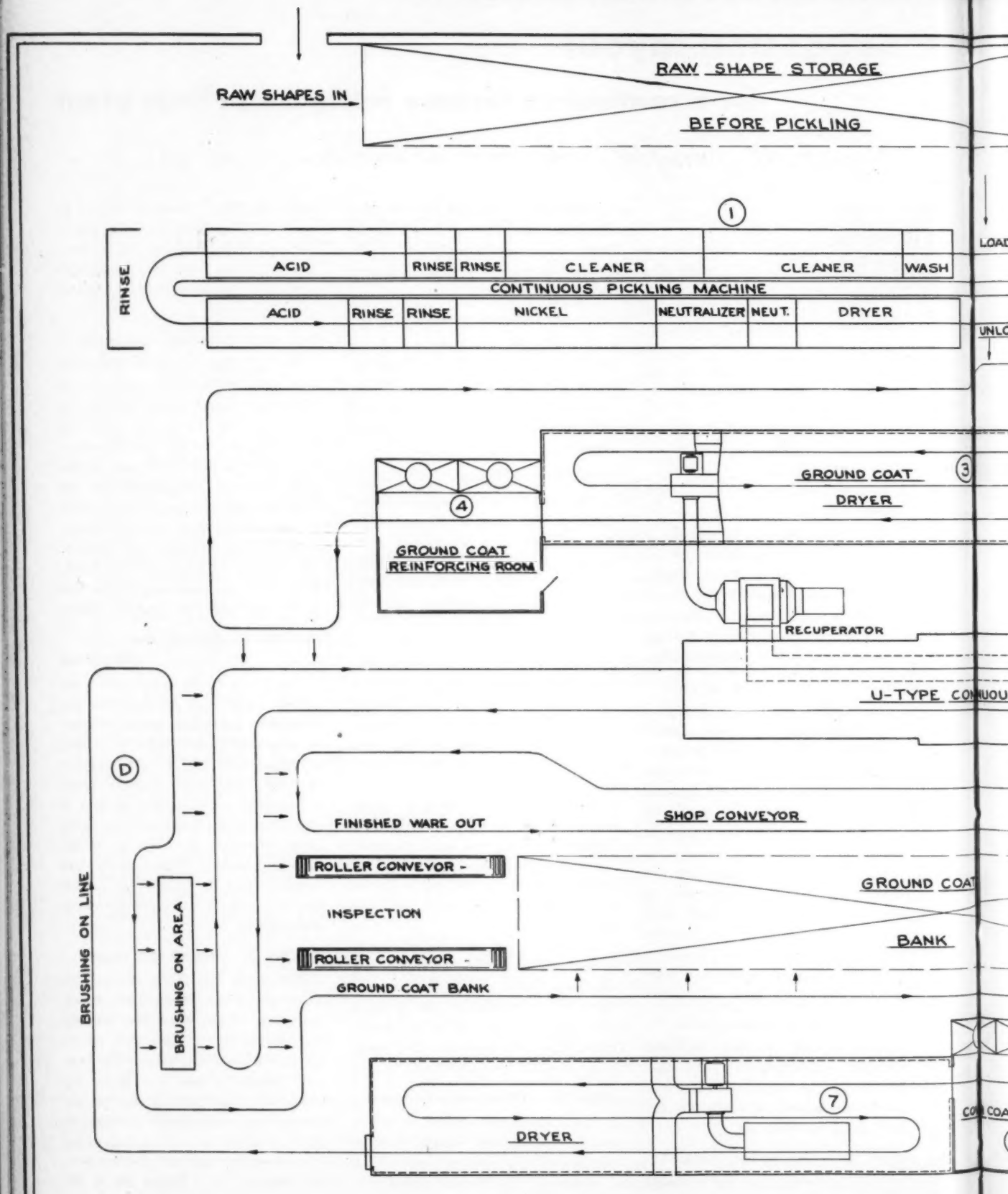
The dryer shown is heated by means of a furnace recuperator which makes use of the waste heat leaving the flues of the furnace, thus effecting a considerable savings. The heat is circulated within the dryer by means of a fan blowing the hot air through ducts distributed throughout

to Page 28 →

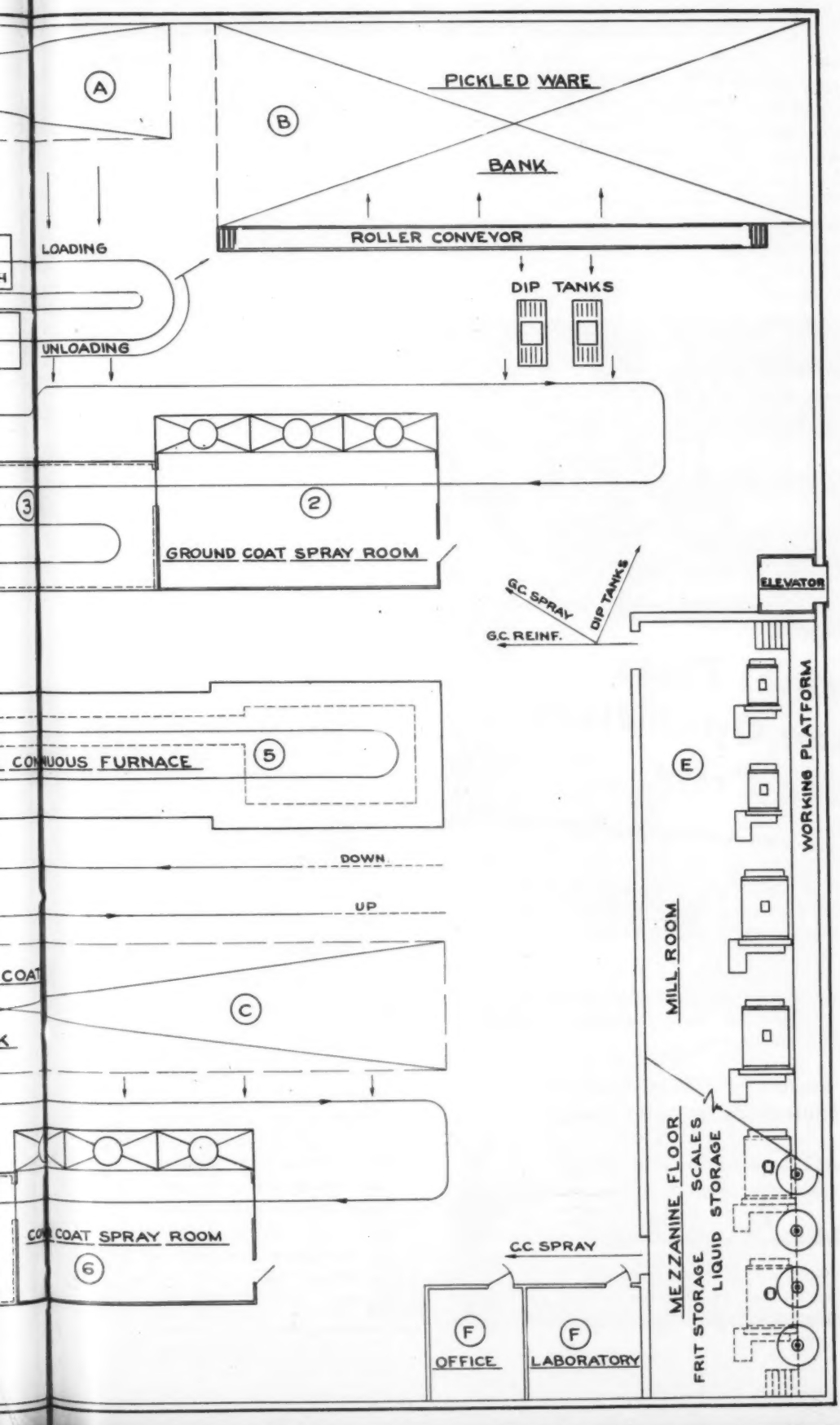
See layout . . . Pages 26 & 27

Plant layout No. 2

A single continuous furnace enameling lan



ng plant for refrigerator liners



1. *Continuous pickling equipment.*
2. *Pressurized ground coat spray room with water wash booths.*
3. *Ground coat dryer using waste heat from furnace.*
4. *Pressurized reenforcing room with water wash booths.*
5. *"U" type continuous furnace, equipped with recuperator.*
6. *Pressurized cover coat spray room with water wash booths.*
7. *Cover coat dryer with indirect fuel fired heater.*

A. *Raw shape storage adjoining fabricating department.*

B. *Pickled ware bank to insure uninterrupted production.*

C. *Ground coat bank adjoining finish coat conveyor.*

D. *Brushing area for "on line" and "off line" brushing.*

E. *First floor mill room with mezzanine for storage of frit, chemicals and liquid enamels.*

F. *Office and laboratory.*

See description on pages 25 and 28.

→ *From Page 25*

the inside of the dryer. An exhaust fan expels the moisture laden air to the atmosphere.

Unit No. 4—Reenforcing room

The spray booths in this unit are the same type described in Unit 2, and similar provision is made for keeping the room under pressure.

Unit No. 5—Continuous furnace

The furnace, which is supplied by the spray conveyor, is of the common "U" type with high speed, thin section, refractory muffle, either oil or gas fired. The ware entering the furnace is slowly preheated by the hot ware coming out. This cold ware is further preheated by the flue of the furnace, which is in the floor, directly under the entrance side. Both these features produce efficient furnace operation.

Burned ground coat ware is inspected and is conveyed to the storage area by means of the roller type conveyor shown, or hung direct on the cover coat spraying chain.

Unit No. 6—Cover coat spray room

The Cover Coat Spraying Unit is the same as that described for the Ground Coat Unit. Such provision for cleanliness is doubly important for the cover coat operations.

Unit No. 7—Cover coat dryer

The dryer is almost identical with the Ground Coat Dryer except that it is heated by means of an indirect oil fired or direct gas fired heater. The open end of the dryer is equipped with an air seal to curtain off the heat.

The spraying conveyor delivers the pieces to the furnace chain either for direct transfer, or through the intermediate brushing area, depending upon the brushing requirements of the pieces.

Conclusion

Finished pieces are taken from the furnace chain, inspected, placed on the shop conveyor and delivered to the assembly or packing department.

In conclusion we might add that with the introduction of the new soft ground coat enamels the layout here presented can easily be adapted to run ground coat and finished cover coats at the same time. This will tend to eliminate large banking areas and eliminate the necessity of changing furnace chain speeds and temperatures.

Editor's Note:

This is the second in a series of plant layout suggestions which Finish is publishing. It is hoped that these layouts, together with the accompanying detailed descriptions, by engineers experienced in enamel plant requirements, will prove helpful in connection with the industry's vast modernization program. Finish will welcome suggestions from readers and will assist in the development and presentation of any "ideas" that show promise.

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for Glaze Opacifiers
for Glaze Frits
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Telephone Churchill 3200. Jack Hunt, Mgr.

Central District Enamelers meet

THE first meeting of the Central District Enamelers Club since cessation of meetings due to the war was held in Cleveland Thursday evening, February 1, in a combined session with the Northern Ohio Section of the American Ceramic Society. The meeting was held at the Cleveland Engineering Society Club rooms.

Officers of the Club present were Norman Stolte, president, formerly with Clyde Porcelain Steel Corp. and now with Magnesium Reduction Company, and Burton Longwell, secretary-treasurer, Republic Steel Corporation.

Officiating for the A.C.S. Section were E. M. Sarraf, chairman, Harbison-Walker Refractories Company and S. M. Swain, secretary, North American Refractories Company.

The meeting was opened by Mr. Sarraf, followed by the A.C.S. Section secretary's report. By-laws for the Northern Ohio Section, as approved by the A.C.S. executive committee, were accepted and passed.

Club Officers

President: Norman Stolte, Magnesium Reduction Company.

Secretary - Treasurer: Burton Longwell, Republic Steel Corp.

Vice Presidents:

Claude Cleghon, Clyde Porcelain Steel Corp.

Dan Gredys, Perfection Stove Company

Jack Trees, Holland Rieger Division, The Apex Elec. Mfg. Co.

R. E. Taylor, The Enamel Products Company

John Reimers, The Pfaudler Company.

The program

J. E. Hansen of Ferro Enamel Corporation introduced officers of the Enamelers Club and the featured speakers of the evening, C. L. Van Derau and R. E. Bisbee, works manager and manager of quality control respectively, Westinghouse Electric & Mfg. Co., Mansfield, Ohio.

The subject of the informal talk by Mr. Van Derau, and detailed outline by Mr. Bisbee, was "Production Control". This is the same subject covered by these speakers at the P.E.I. meeting in Cleveland on December 5 and reported earlier in *finish*.

No further club meetings contemplated

It was announced by the Central District Enamelers Club officers that no attempt would be made at present to revive the Central Club due to the pressure of war work.

TOP ROW:
Left — Norman Stolte, president of Central District Enamelers Club. Center — Burton Longwell, Club's secretary-treasurer.
Right — Burnham King, Jr., of Harshaw Chemical, photographed at the meeting.

BOTTOM:
G. A. Singer and Don Beal carry the Youngstown Sheet & Tube banner at the Cleveland meeting.

FINISHFOTOS

But for a damaged film you would see Finishfotos of Jack Parsons and Harold Skemp of Carnegie-Illinois Steel; E. C. Petrie, North American Refractories; S. M. Swain, A.C.S. Division secretary; E. M. Sarraf, A.C.S. Division chairman; Dick Schwendler, Enamel Products; Jack Trees, Holland-Rieger; Eddie Davidson, Ed Hansen and J. E. Janecke of Ferro; H. C. Draker of Harshaw; and Bob Evans of Newark Stove Co.

NEWS

Wiese to Florence Stove's Gardner plant

George Wiese, formerly with Baltimore Enamel and Novelty Company, Baltimore, and for a number of years prior to that in charge of enameling at Standard Gas Equipment, Baltimore, has joined the organization of Florence Stove Company, Gardner, Mass. Mr. Wiese is in charge of the porcelain enameling plant at Gardner.

International Lighting Exposition postponed

Postponement of the International Lighting Exposition scheduled for Chicago on April 19-23 until next year was announced by Mr. S. R. Naysmith, chairman of the Industrial and Commercial Lighting Equipment Section of the National Electrical Manufacturers Association. This action resulted from the desire of the Association to co-operate fully with the government to reduce travel resulting from conventions and expositions.

The Section released the following statement: "While lighting is essential to effective war production, and while every exhibitor in the now postponed Exposition is engaged in vital war production, it is the conviction of the members of the Industrial and Commercial Lighting Equipment Section of NEMA that in view of the expressed desire of War Mobilization Director Byrnes, the International Lighting Exposition planned for April of this year should be postponed."

According to R. W. Staud, chairman of the publicity and attendance promotion committee, interest in the Exposition has been running high. It is the plan of the I. & C.L.E. Section to continue with the plans so that when Victory is definitely at hand a new date can be set.

The Cooperative Enameling Company, Cleveland, Ohio jobbing plant, is said to be busy with war work such as heat treating and the enameling of stove parts for essential wartime use.

Gordon Lasiter is now works manager, and George Boros is assistant works manager.

Pressed Metal Institute cancels annual meeting

In compliance with the request of the government to cancel projected meetings when possible, in accordance with O.D.T. Restriction 761, the Pressed Metal Institute cancelled its annual meeting which was scheduled for Cleveland, February 13.

F. C. Greenhill, president, pointed out that one reason why it is possible to omit the regular annual meeting this year is the fact that the Institute is organized on a district basis. Members are kept advised of the Institute's national activities through district meetings. Matters that would come before the annual meeting will be handled by correspondence, he said.

At the District meetings of the Institute various subjects are discussed by authorities and forums are held on matters of local interest. Members have found these meetings informative and instructive according to Mr. Greenhill and they are well attended.

G.E. completes distributing organization for major appliances

C. R. Pritchard, general sales manager of the appliance and merchandise department of General Electric, announces that the department's postwar distributing organization for major appliances is completed.

The department will have about 60 wholesale distributing outlets for G-E refrigerators, ranges, water heaters, home laundry equipment, dishwashers, sinks and kitchen cabinets. According to the report these distributors, operating in assigned trading areas, will maintain sales organizations and local warehouse stocks at over 125 points, and will be prepared to serve the retail dealers in every city and town in the United States, Hawaii and Alaska.

High-chair Admiral

This dashing youngster is the son of Lt. (j.g.) M. P. Ferro, and grandson of Lucian Kahn, Estate Stove Co.

Homemaking is America's biggest business, says G-E range manager

R. S. Hayes, left, member of the sales promotion committee of NEMA, and J. R. Poteat, manager of G-E range and water heater division, at annual NEMA meeting.

It should be pointed out that the statements made by Mr. Poteat were at a meeting held before the current critical point in the war situation, and should, therefore, be projected to a time after the war picture has taken a definite turn and we are again thinking in terms of peacetime activity.

In a speech before the annual meeting of the National Electrical Manufacturers Association, J. R. Poteat, electric range manager for General Electric, suggested cooperative action on the part of all industry for cultivating the consumer "who keeps the wheels of industry moving."

He pointed out that the electrical industry is serving the biggest business in America—homemaking—since the American housewife spends from thirty to forty billion dollars every year. This was offered as a general statement, he said, but serves to point up the fact that any market with a potential 35,000,000 customers is worth doing something about.

Another point of interest was Mr. Poteat's statement that the residential market has 83 per cent of the consumers on utility lines; provides 35 per cent of the utility revenue, but takes only 17% of the energy used.

Mr. Poteat, who also manages G-E's water heater division, warned his NEMA listeners that,

"The market is large and ready for cultivation, but it will never create for us the business there is unless we do something about it. One of the greatest dangers to our industry is our attitude of detachment from the industry as a whole. We see ourselves as many parts of the electrical industry, but not frequently as a whole powerful force available for action.

"Keeping the homes of this country going is its largest single business. It's the main business for which every other business exists. If, therefore, there is business potential anywhere, it exists in the residential market."

Frigidaire installs veterans' reemployment plan

Carl A. Copp, Manager of Industrial Relations, Frigidaire Division, General Motors Corporation, Dayton, Ohio, recently announced the putting into effect of a comprehensive program for veterans' re-employment.

At the present time a total of 230 discharged veterans of the present war, formerly employed by the Frigidaire factory, are back at work in the Dayton plants under this re-employment program.

Special features of the Frigidaire re-employment plan provide that all jobs are analyzed by department supervisors to establish a record of minimum physical requirements. Likewise, all job applicants, civilians as well as veterans, receive thorough physical examinations by the company medical department to determine how their various physical qualifications compare with the physical requirements of the many different jobs analyzed.

The Frigidaire plan also provides definite procedures for placing job applicants who are physically handicapped on carefully selected jobs that they are able to handle. Then as their physical ability improves, special provision is made for their advancement to jobs suited to their improved physical condition, when such jobs are available.

Sylvania opens twenty-third plant

The opening of another new Sylvania plant, located in Jamestown, New York, has been announced by Mr. H. W. Zimmer, of Sylvania Electric Products, Inc. The new plant covers approximately 48,000 square feet of space formerly occupied by Broadhead Mills.

The newest of Sylvania plants will be under the management of Mr. George B. Erskine, with Mr. Rolf D. Ripley as resident supervisor. Production will begin in the near future and will supplement the output of several other Sylvania plants, producing parts for electronic tubes and other electrical equipment.

Inland Steel's combined health & reemployment program for veterans

Untouched by bullet or shell, thousands of returning veterans today face a future of broken health that may become as tragic as the loss of an arm or leg.

Victims of strange diseases contracted in far-flung military operations — from Africa to China, from camps in the Rockies to the Baltic Sea and Moscow — these ex-soldiers are haunted by the threat that serious after-effects of their illnesses may bar their return to normal civilian life.

In a program to assist such veterans, Dr. E. H. Carleton, medical director of Inland Steel Company, disclosed that Inland's Medical Department has furnished the company's physicians with a complete analysis of tropical, Asiatic, and similar dis-

eases to which a soldier might have been exposed.

Inland's program to detect and arrest inroads of tropical diseases is only part of a complete plan for re-employment and rehabilitation of returning veterans, Dr. Carleton pointed out. The plan sets up procedures to handle all the problems that employment, personnel, and medical officers must solve to place the ex-soldier in the proper job when he appears in the employment office of Inland's Indiana Harbor Works at East Chicago, Indiana.

Application of the prescribed methods results in a comprehensive picture of the veteran, his capabilities, background, and physical condition. Selection of the job most suitable for him thus becomes a scientific process, with a minimum chance of error in placement.

The program has been designed to cause as little disturbance as possible in existing medical, personnel and safety procedures. But where changes have been necessary—they have been made.

On a broad scale, the newer concepts of rehabilitation, as developed by Inland, will be applied wherever possible to employees in general. Dr. Carleton points out:

"This is not just a temporary affair, but can be a useful instrument in the future development of industrial medicine.

P. E. I. market research committee completes plans for current work

The Market Research Committee of the Porcelain Enamel Institute held a meeting in Pittsburgh on January 15. The purpose of the meeting was to lay the groundwork for the committee's operations in the coming year. This was the first meeting of the new committee headed by Robert J. Ritchey, of Carnegie-Illinois Steel Corporation.

The committee stated that the work last year consisted mainly in gathering available statistics which, when compiled, indicated the great magnitude of the porcelain enamel markets that await the industry after wartime restrictions are lifted. New markets on which no such data has been developed will be the object of the committee's current research.

For this purpose, the fields of application for porcelain enamel have been grouped into three divisions — Industrial, Commercial, and Domestic. Studies of new possibilities for uses of porcelain enamel in each will be investigated.

It was reported that work has already begun on preparing reports for the industry on specific items which hold great promise for the immediate future, such as air markers.

In the photograph, the members of the committee shown are: left to right, seated: B. F. Birdwell, Porcelain Metals Corporation, R. J. Ritchey, Carnegie-Illinois Steel Corporation; Edward Mackasek, Porcelain Enamel Institute; Herbert Turk, Pemco Corporation. Standing: George S. Blome, Baltimore Enamel & Novelty Co.; F. C. Woleslagle, Carnegie-Illinois Steel Corp.; J. F. Sweeny, Walker & Downing; F. L. Meacham, Chicago Vitreous Enamel Product Co.—J. F. Ingram, Ingram-Richardson Manufacturing Co., was present but is not in the photograph. N. G. Wedemeyer, Rohm & Haas Company, is also a member of the committee.

Philco executive predicts 6,000,000 refrigerator demand

Harry Boyd Brown, national merchandise manager for Philco Corporation, in an address entitled "Post-war Production and Consumption," before a meeting of women leaders sponsored by the National Association of Manufacturers at the Bellevue-Stratford Hotel, is quoted as saying:

"The research laboratories of this country, and the amazing resourcefulness of the engineers, inventors, production experts and the men and women of America have accomplished the greatest war production miracle in the history of mankind. Equally great achievements can be expected when peace returns."

Later in his talk Mr. Brown stated: "The post-war demand for goods in the first two years after victory will surely exceed the production capacity of the United States. Demand for refrigerators will exceed 6,000,000 units against production of 3,700,000 in 1941. The scarcity of every type of merchandise containing metal is so great that when production is resumed, it will probably take several months to stock distributors and dealers, to say nothing of meeting consumer demand."

New packaging method saves paper

By applying engineering techniques to the shipping room, the Westinghouse Lamp Division announced it has introduced a sturdier new fluor-

escent lamp container which will save 2,500,000 square feet of box board and 1,500,000 feet of paper sealing tape during the next 12 months.

The new package opens at the ends instead of at the sides, enabling the saving of box board equivalent to two whole sides of the carton because overlapping flaps extending the length of the old carton are eliminated. Sealing the ends requires 54 per cent less paper tape than sealing the former side flaps.

Detrex Corporation advances two executives

A. O. Thalacker has been elected vice president and general manager of Detrex Corporation. He joined the organization in 1937 and since that time has held the executive positions of assistant secretary and secretary.

Research activity in field and laboratory has been considerably expanded by Mr. Thalacker in the company's Industrial and Alkali divisions, the report states.

E. W. Allison, who has been in the legal department of the firm since 1941, is now secretary.

Detrex Corp. is celebrating the company's 26th year in business. Meetings were held in Detroit and Hershey, Pa., and are planned for Western, Pacific and Southern regions to commemorate the anniversary and cover present and contemplated developments in Detrex products.

At the Detroit meeting Robert A. Emmett, president and chairman of the board, traced the history of the company from a small garage to the company's present 120,000 square feet of floor area.

Ed Adams with Erie Enameling

Ed Adams, who has for many years been connected in various capacities with Roberts and Mander Stove Company, is now superintendent of The Erie Enameling Company, Erie, Pa.

It is reported by Erie that Ed has been employed to improve quality, install modern techniques in all phases of the enameling procedure, and to teach the employees the proper handling of the ware to achieve these results. The company intends to back this plan with a complete plant modernization program.

Geo. M. Clark Division of American Stove receives Army-Navy "E"

Col. John Slezak congratulates Robert K. Clark on "E" Award.

On Monday afternoon, February 5, we had the privilege of attending the presentation ceremonies incident to the receipt of the Army-Navy Production Award by the men and women of the George M. Clark and Company Division, American Stove Company, Harvey, Illinois.

John Harrington, Columbia Broadcasting System, was the able master of ceremonies. Opening remarks were by Arthur Stockstrom of St. Louis, president of American Stove Company and son of the original founder. Presentation of the award for the U. S. Army was made by Col. John Slezak, with a brief acceptance address by Robert K. Clark, company vice president and division manager. Mr. Clark is son of the founder of the original George M. Clark company.

Presentation of "E" pins was made by Lt. Commander E. A. Hawthorne of the U. S. Navy. Those receiving token pins for the employees were: Paul Borgarding, Reinhard O. Meyer, Anna E. Kroeger, John Post, Lottie Soyka, George Vander Woude and Svea Newhart. Svea Newhart was introduced as a newcomer to the organization with *only* 18 years' service. An old-timer in the George M. Clark organization will have from 34 to 44 years' service.

A brief talk covering acceptance of the award by the employees was made by Paul Borgarding, president Local No. 1410, C.I.O. United Steelworkers.

Excellent music was furnished by the Board of Trade legion Band, with Col. Armin F. Hand conducting. Singing of "America" and the National Anthem was led by M. W. Batchelder, who has been active in contact work on military projects for the company during the war.

47th Annual A.C.S. Meeting postponed

A wire from Ross Purdy, secretary of the American Ceramic Society, told of the definite decision to postpone the 47th Annual Meeting originally scheduled for Buffalo, New York, April 15 through 18.

A letter to the membership by E. H. Fritz, president, explained that while the ODT had not responded to a petition from the Society to hold the meeting, a majority of the Board of Trustees voted for cancellation. According to Mr. Fritz, letters from members voiced sentiment both for and against voluntary cancellation, but the returns showed a majority in favor of this move. As a result the petition to ODT was voluntarily withdrawn.

Mr. Fritz reported a proposal that a general meeting be held in the fall in place of the autumn meetings by Divisions. This is to be considered after the present ban on meetings is removed by ODT. In the meantime, greater importance will be placed on Local Section meetings and committee activity.

NESA studies effects of brown-out order

At the annual meeting of the National Electric Sign Association in Chicago on January 23 and 24 members discussed WPB Order U-9, which prohibits the use of electricity for certain purposes such as signs, outdoor advertising and marquees. While it is the avowed intent of the association to cooperate in every respect with the Government's order, it is pointed out that in its present form a definite hardship is placed on small merchants who depend largely on their identification signs for business, and on thousands of sign manufacturers whose present existence depends almost entirely on maintenance of present signs.

In a preliminary study of the order certain facts were brought to light concerning the use of coal that might be attributed to signs. A report at the meeting, based on authentic sources, showed the sign load in proportion to total sales of electricity for the city of Chicago to be .017 per cent. It was pointed out that less than 3/10 of 1% of all the coal used in the country, and only 1% of all coal required to generate electricity could be saved under the order.

A committee was appointed to study results of the brown-out order. It was the feeling of the group that under a plan whereby signs and show windows could be illuminated during certain night hours, and the use of electricity curtailed in other parts of the premises, at least as much if not more coal could be saved, while the business of thousands of small merchants would not be critically affected.

Members of NESA emphasized their willingness to cooperate with anything that would contribute to the war effort, but indicated a belief that a revision to Order U-9 might result in even greater saving in coal on a basis more equitable and less drastic to the general welfare of business — particularly small merchants.

New vice president at Philco in charge of refrigerator production

Edward F. Theis has just been elected vice president in charge of refrigerator production for Philco Corporation, according to an announcement by John Ballantyne, president.

The new duties assumed by Mr. Theis on February 1, call for added important research and development work for the war production program of Philco's Refrigerator Division.

Mr. Theis returns to Philco Corporation from Curtiss-Wright Corporation where he went in 1942 as manager of its Indianapolis Propeller plant. The new vice president was connected with the automobile industry from 1908 to 1927. Among his later connections were those of factory manager and, later, general production manager for Servel, and duction manager for Servel, and works manager for Fairbanks-Morse Company's home appliance division. When Philco acquired the Fairbanks-Morse refrigerator rights in 1938, Mr. Theis became works manager of the company's refrigerator division.

Schwendler back at Enamel Products

R. H. (Dick) Schwendler, who until his recent release from active service was Major Schwendler, is now back at The Enamel Products Company, Cleveland, as manager of research and development.

Dick is also a veteran of World War I. During the present war he was on the Military Staff of O.C.S. and then with the Flying Training Command on the West Coast.

New Army interest in ceramic coatings

It was reported that there is new interest in Army circles in ceramic coatings which may serve to protect vital parts of combat vehicles against corrosive attack. Some of the locations where equipment must now be used are among the worst for rapid deterioration of metal parts.

One of the first steps in this regard has been the testing of National Bureau of Standards ceramic coatings developed for resistance to corrosion and high temperatures. (See "High Temperature Ceramic Coatings Used . . " p 37, Jan. '45 *finish*).

Should present tests prove successful the enamel industry may logically be called upon to do some additional speedy work for Uncle Sam. Information in regard to the use of Bureau of Standard Coatings should be obtained from the Director of the Bureau, Washington, D. C.

This MAHON *finishing* SYSTEM

is effecting IMPORTANT SAVINGS in the final finishing of PORCELAIN *parts*

One of the finest examples of the economy effected by Mahon cooperation in the modernizing of a FINISHING production line is this installation made at the Florence Stove Company, Kankakee, Ill. This automatic system, for final finishing of porcelain parts, was installed as the result of a carefully planned survey conducted by Mahon production experts cooperating with the Florence Stove Company engineers. Work travel, proper type and placement of equipment, were determined only after intensive study. When the system went into operation, it was found that work was so greatly speeded up, production time was cut one-third—even in the face of greatly increased production demands. Mahon engineers may be able to show similar savings for you.

Lower Left: Two Mahon Gas Fired, re-circulating Drying Ovens, each 90′ long by 14′ high are placed end to end on the roof. Designed to handle 5000 pounds of steel each hour.

Lower Right: This unique Pin-Point conveyor table carries parts through Spray Booth and then by conveyor through oven. Note baffle eliminators in Spray Booth, part of the equipment provided for reclaiming porcelain overspray.

Write today for complete information relative to YOUR finishing problems.

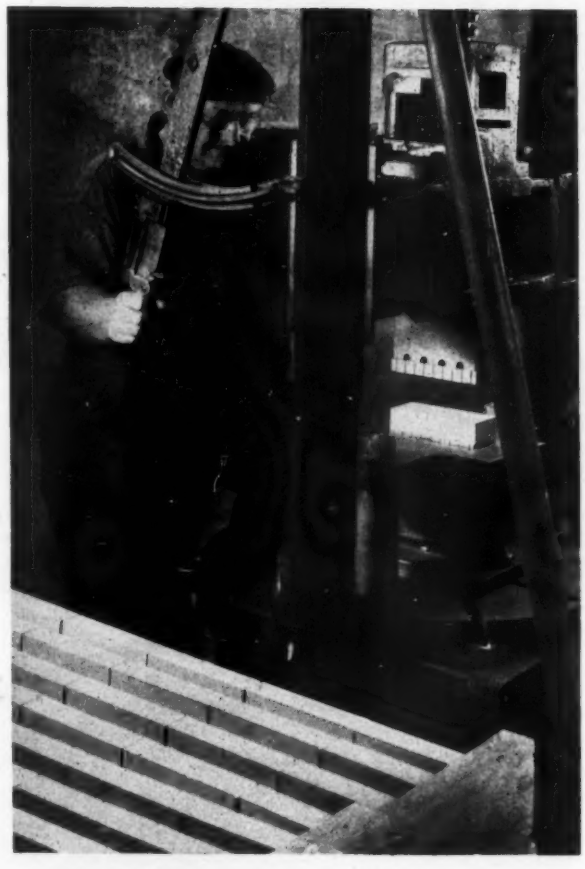
THE R. C. MAHON COMPANY

DETROIT 11 — CHICAGO 4

Manufacturers of Metal Cleaning Machines • Rust Proofing Machines • Hydro-Filter Spray Booths • Ovens of All Types • Filtered Air Supply Units • Hydro-Foam Dust Collectors—and Many Other Units of Special Production Equipment—including Complete Finishing Systems

ORDER NOW — AND BE READY

ALTHOUGH the majority of enamel plants are not now in operation, wise enamelers are preparing for the future. We are now sixty days behind on porcelain ball shipments. For this reason we urge your early consideration of your requirements for balls and brick.



Under normal conditions we pride ourselves on speedy delivery (usually same day the order is received). Today much of our plant is on important war work.

We suggest a current check of all your mills, and the placing of an early order for your porcelain requirements.

McDANEL REFRACTORY PORCELAIN CO.

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Chicago Vitreous Enamel Product Company • Exclusive representatives for the enameling industry.

McDANEL MILL LINING BRICK

Chicago Enamelers' fifth wartime meeting has big attendance

THE fifth meeting held by the Chicago District Enamelers Club since the start of the war had the largest attendance of the five wartime meetings, with 109 present at the luncheon.

Following the luncheon President Howe introduced a few of the out-of-town visitors and one ex-president. Introductions included P. S. Montemayor of Mexico, who is at present attending the University of Illinois; Lee English of Walker and Downing, advertising agency for the Porcelain Enamel Institute; Sam Frantz of S. G. Frantz Co., Inc., New York City; Wm. L. Donaldson, chief chemist, George D. Roper Corporation; and E. R. Brauner, former Club president, foreman in charge of finishing department (night operations) at Continental Industries, Inc.

The secretary reported that it is planned to hold future meetings in a loop location to make it more convenient for those coming in from out of town.

The program

An excellent program was provided by the committee in charge, including a paper by F. A. Petersen, special research assistant professor, University of Illinois, whose topic covered systematic testing before, during, and after the enameling operation, (An adaptation of this paper appears in full in this issue of *finish*.) and a talk by Dr. G. H. McIntyre, director of research, Ferro Enamel Corporation, whose topic was "Application of Enamels to the New Steels."

Club president E. E. Howe

Following the papers the meeting was opened for discussion. Dr. Fred Reisinger of Promat Division, Poor and Company, raised several questions in regard to recommendations covered in Dr. McIntyre's talk concerning the quantity of nickel deposition. This was followed by an informal discussion by B. T. Sweely, vice president in charge of research, Chicago Vitreous Enamel Product Company, in which he confirmed Dr. McIntyre's presentation as being representative of the feeling of other frit producers. He particularly stressed the desirability of working toward thinner coatings. He pointed to the fact that enamel coatings had already been reduced in thickness over a number of years by .015 to .025 inch, and indicated the possibility of further reductions through continued research effort.

As an illustration he pointed to the result that would be expected in striking a piece of enameled ware, with normal or heavier than normal application of cover coat over standard ground coat, with a ball pean hammer. In this instance the cover coat shatters and ground coat spawls, leaving a serious break in the enameled surface. With the extremely thin coatings that have been used during the "one-coat" program now under way it has been possible to strike an enameled sheet of comparatively light gauge steel, deform the metal, and yet have no spawling back whatsoever.

Officers to be elected at next meeting

According to the program committee, the next meeting of the Club will, in all probability, be held early in May. This will be the Annual Meeting and will provide for election of new officers. Ralph Foraker, Pemco Corporation, was appointed chairman of the nominating committee.

Application of enamels to the new steels

By DR. G. H. MCINTYRE

The commercial success of the application of one-coat white enamels to the new steels will be brought about through the full realization of equal responsibility by the steel manufacturers, the frit producers and those in the enamel shop producing the finished product. The steel manufacturers and the frit producers have early recognized their responsibility in this program and have been cooperating to produce better steels and better enamels. Recent commercial and laboratory trials have demonstrated that excellent progress has been made.

It is my purpose to stress the importance of the enamel shop in this program and the responsibilities which enamel shop operators must assume in order that full realization will be had.

Laboratory and supervision requirements

Enamel shop management must be prepared to provide adequate quality and process control of all operations in the application of the new enamels to the new steels. This means that a suitable laboratory, fully equipped, as well as a system of responsibility for process and production control must be established. Having provided the necessary equipment and process standards, at least one trained technician should be made responsible for the full supervision of these

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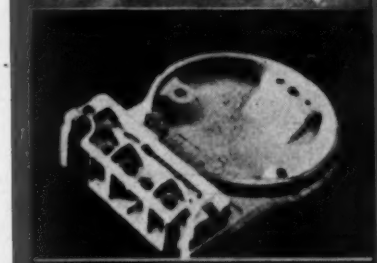
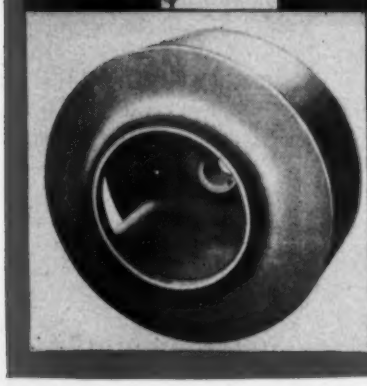
MAYBE THE ANSWER TO YOUR PROBLEM IS *Here*





INDUSTRIAL PORCELAIN ENAMEL

If porcelain enamel is the practical finish for the job, correct principles of design are applied and the proper Frit used, satisfactory adherence and performance will result. Many industrial products now protected with lifetime porcelain enamel have been developed and pioneered by the O. Hommel Co. All of the properties essential in Industrial Porcelain Enamel are to be found in a Hommel Frit. A few porcelain enamel applications that O. Hommel Service Engineers have played an important part in developing for industrial applications include:

- √ Lining of pump housings and coating of impellers.
- √ Mammoth Porcelain Lined Chemical Tanks.
- √ Stills and Mixers used in the chemical industry.
- √ Exhaust Manifolds.
- √ Meter Bases.
- √ Insulators.
- √ Electrical Outlet boxes.
- √ Protective coating on working parts of various mechanical devices.
- √ Enameled Housings for mechanisms.

Such applications demand Porcelain Enamel Frit with the correct coefficient of thermal expansion—extreme resistance to abrasion—resistance to high temperatures—resistance to organic and mineral acids—special finishes—liberal firing range—elasticity . . . All to be found in a Hommel Frit.

Many of these industrial applications require special colors, and Hommel Enameling Oxides have been developed with particular properties to meet the need.

Consult Hommel Service Engineers for suggestions from Designing to Plant Production. They roll up their sleeves and go to work on your problem. Write or wire today.

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News from Washington

Rules stiffened for contracts placed in labor urgency areas

A five-point program designed to align WPB action on contracts with labor supplies was announced by J. A. Krug, chairman of the War Production Board. The program is reported approved by the Army, Navy and other procurement agencies as well as by the WMC and the WPB.

Under the plan:

1. All prime contracts requiring additional labor over the producer's current WMC ceiling will be subject to Production Urgency Committee approval before they can be placed in a Group I labor area.

2. All subcontracts for Class A products involving $100,000 or more, requiring labor over the current WMC ceiling, will be supject to Production Urgency Committee approval before they can be placed in a Group I labor area.

3. No spot authorizations will be made in any Group II labor areas unless they are unanimously approved by the Production Urgency Committee concerned.

4. Restrictions on construction will be strengthened.

5. Full support will continue to be given to WMC's employment ceiling program, which went into operation July 1, 1944.

Present status of "spot authorization" program

Although Priorities Regulation 25, the "spot authorization" order, has not been revoked, activity under it has been sharply restricted by W.P.B. until the present tight production situation is eased.

Summarizing the current situation in regard to PR-25, WPB pointed out:

1. The allotments and authorizations that have already been granted have not been canceled.

2. Because of shortages, it is unlikely that mill orders for steel, copper in most forms and aluminum sheet placed under PR-25 will be filled during the first quarter and perhaps during the second.

3. Spot authorizations still can be approved to utilize any amount of idle and excess material provided the applicant has available facilities and labor. New allotments of steel will be limited to not more than 10 tons of carbon and two tons of alloy steel to "piece in" idle and excess materials.

4. Two additional severe limitations have been placed upon the functioning of PR-25. These are:

(a) The "four-power pact" issued December 1, 1944, and signed by the Army, Navy, War Manpower Commission and the War Production Board. Field representatives of these agencies in all areas of critical labor shortage, plus 44 in other areas centering about major manufacturing cities, were ordered by this document to grant no "spot authorizations" for 90 days except in unusual cases.

(b) Warehouses, now the best source of new material for "spot authorizations," have been limited in the amount of material they can deliver on "Z" allotments.

STEEL — Distributors have been directed to deliver only 10 tons of carbon steel and two tons of alloy per customer each quarter, and customers are limited to a total of those amounts on "Z" allotments. Stainless steel deliveries have been stopped entirely. "Z" allotment orders without tonnage limitations may still be placed with mills, but it is extremely unlikely that they can be filled because regular Controlled Materials Plan orders come first.

5. A manufacturer who has a "spot authorization" is prohibited from ordering more than these amounts from warehouses in any quarter. These new restrictions are contained in Direction 6 to CMP Regulation 4, which was announced recently.

6. When a manufacturer needs more material than the amounts listed above, he may make an appeal to WPB in Washington as a special hardship case.

Request curtailed use of gas in Appalachian area

Edward Falck, director of the War Production Board Office of War Utilities, issued an urgent appeal February 2nd to all users of natural gas throughout the Appalachian area to reduce immediately their consumption of gas in order to avert complete breakdown of distribution facilities.

During this emergency period, the War Production Board has ordered all gas companies to do everything within their power to curtail or completely eliminate the use of gas in places of amusement, such as theaters, moving picture houses, bowling alleys, night clubs, and in educational institutions, such as libraries, museums, schools, and in any other building, public or private, where this can be done without endangering the health of the community.

Trade practice rules for water heater industry

Trade practice rules for the Water Heater Industry have been promulgated by the Federal Trade Commission under its trade practice conference procedure.

The products of the industry to which the rules apply consist of water heaters, and parts and accessories. Members of the industry are the persons and concerns who manufacture or market these products. Water heaters covered by the rules include the several types in which the heat is produced by gas, electricity, fuel oil, kerosene, coal, or by other fuel.

Water heaters form a part of essential equipment in all modern homes. The industry's peacetime production of water heaters reached nearly 2,000,000 annually, aggregating approximately $80,000,000 in value at retail prices.

In the rules, various unfair methods of competition and trade evils are catalogued as unfair trade practices which are to be avoided and prevented as harmful to the industry and to the purchasing public. Support of sound business methods is further provided in additional rules. Cooperative effort on the part of the industry with the Commission is planned to afford increased protection to the industry and the public, and to maintain free competition.

In the proceeding, instituted upon application from members of the industry, a trade practice conference was held in Chicago, Illinois, under the auspices of the Commission. Fol-

lowing this conference, a draft of proposed rules in appropriate form was published by the Commission. The rules were made available to all industry members and other interested or affected parties upon public notice whereby they were afforded opportunity to present their views, including such pertinent information, suggestions, amendments, or objections as they desired to offer, and to be heard in the premises. After this notice, public hearing was held in Washington, D.C., and all matters presented or otherwise received in the proceeding were considered by the Commission.

Upon full consideration of the entire matter, final action was taken by the Federal Trade Commission to approve a list of trade practice rules. *(Copies of the rules may be obtained upon application to the Federal Trade Commission, Washington, D. C.)*

Report on Enameled Utensil Advisory committee meeting

(Steel-fuel-chemicals-canners)

Members of the Porcelain Enameled Utensil Industry Advisory Committee at their recent meeting reported that the industry is adversely affected by the current natural gas shortage and delays in the delivery of steel.

Most enameled ware manufacturers are prepared to use oil or other substitute fuels and stand-by facilities when natural gas can not be made available, committee members said. However, in some areas, they added, they are unable to obtain sufficient oil because bad weather has caused disruption of transportation facilities. WPB officials, in emphasizing the seriousness of the natural gas situation, said that it has been necessary to curtail the use of gas by some plants engaged entirely in war production as well as by plants making civilian goods.

Industry members were urged to keep themselves informed of the rapidly changing chemicals situation. Some of the metallic oxides and other chemicals used by porcelain enameled ware producers recently have become critical, it was pointed out.

WPB officials commended the enameled utensil industry for its contribution to the war effort, particularly for its wartime research, which has resulted in the development of improved types of hospital ware, and other military supplies capable of withstanding adverse war conditions.

A specific program for the 1945 production of cold pack (water bath) canners has not yet been approved, but is being considered by WPB, committee members were told. However, manufacturers are permitted to make cold pack (water bath) canners within their over-all quotas for enameled ware, as established in Limitation Order L-30-b.

New clauses for war procurement contracts

Because the 1945 munitions program will run over $64,000,000,000 substantially above the 1944 level, and because increasing delays in deliveries of component parts to war manufacturers threaten to delay production of vital war items, J. A. Krug, Chairman of the War Production Board, outlined steps that are being taken by the procurement agencies to enable industry to meet the expanded program.

These steps include:

1. Procurement claimant agencies have instructed their contracting officers to place promptly contracts covering their forecasted needs, at least through 1945, wherever practicable.

2. Procurement agencies have also directed that, in the future, prime contracts shall contain clauses requiring that:

a. Prime contractors place all necessary subcontracts and purchase orders promptly with their suppliers to assure receipt of needed materials and components in time for the scheduled deliveries called for in the prime contracts, and

b. Each contractor, in his subcontracts and purchase orders, include similar provisions to those in his contracts, requiring his suppliers, in turn, to place orders promptly with their respective suppliers.

In general terms, Mr. Krug said, these steps are intended to make it possible for manufacturers and their subcontractors to "pull out the stops" and drive ahead for the year's production goals.

First meeting of gas-fired furnace advisory committee

The newly appointed industry advisory committee representing manufacturers of gas-fired furnaces recently held its first meeting with officials of the Office of Price Administration in Washington, D. C.

The following officers were elected: Chairman, F. C. Packer, assistant to president, Payne Furnace Co.; Vice Chairman, Arthur Wrieden, general manager, Lennox Furnace Company; and Secretary-Treasurer, C. B. Kuhn, secretary and treasurer, Coleman Lamp and Stove Co.

Others attending the meeting were: C. O. Butler, president, Mayflower Conditioners, Inc.; E. M. Bricker, sales manager, Fraser and Johnston Co.; Arthur Martinsen, president, Hammel Radiator Engineering Co.; Gordon Rieley, vice president, Bryant Heater Company; and James R. Scott, assistant to president, L. J. Mueller Furnace Co.

Representatives of the industry said at the meeting that the majority of manufacturers of gas-fired furnaces were primarily engaged in war work. The discussions were centered chiefly around the problems and methods of operation peculiar to the supply of this type of commodity during the present war emergency and that will confront the industry during the post-war reconversion period.

N.H.A. estimates need for 12,600,000 non-farm houses in first 10 post war years.

John B. Blandford, Jr., Administrator of the National Housing Agency, in a speech in Atlanta, Ga., early in February, pointed out that the National Housing Agency has estimated a probable need for 12,600,000 new dwellings in the first ten years after the war, exclusive of substantial need for new farm houses.

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An Enameling Improvement ready *now!*

THE Titanium Alloy Manufacturing Company announces a new titanium alloy enameling steel which offers improved quality and reduced cost to the manufacturers of vitreous enameled products.

This new steel has exceptional ductility, being in this respect at least equal to the best deep drawing steels previously known. It also has superior resistance to sagging at enameling temperatures.

Tests conducted in many different laboratories have indicated that the use of titanium alloy enameling steel virtually eliminates primary boiling because of the fact that the carbon in the steel has been stabilized by the titanium. This indicates that ground coat can be eliminated, assuring greater uniformity of finished product and reducing rejects and re-operations very substantially. It permits furthermore the application of lighter coats of enamel with the consequent reduction in cost and improvement in appearance and wearing qualities of many enameled articles.

There are many additional features of interest to both steel producers and manufacturers of enameled products.

A member of our Technical Staff will be glad to go over details with you at your convenience. Send us a card for prompt action.

* * *

Pending patent applications on the new enameling process and product made thereby are owned jointly by Inland Steel Company and The Titanium Alloy Manufacturing Company under Trust Agreement.

THE TITANIUM ALLOY MANUFACTURING COMPANY

Executive Offices: 111 BROADWAY, NEW YORK, N. Y. *General Offices and Works:* NIAGARA FALLS, N. Y.

→ *from Page 40*

This would call for an annual average construction of 1,260,000 nonfarm houses, 80 per cent greater than the average for the 1920's and about double the rate of construction in the three years preceding the present war.

It was estimated, Mr. Blandford said, that such a rate of production would take care of new families, returning veterans and families now living doubled up, as well as replacing half the clearly substandard housing during the 10-year period.

He added that the nation's housing goals should be achieved in the post war era by maximum reliance upon private enterprise and local communities, and that the peacetime housing role of both the Federal and State governments should be "to stimulate and strengthen enterprise and to encourage and assist community responsibility."

The value of standard tests to enamelers

(continued from Page 24)

will be improved in these respects.

A most important point in regard to the successful operation of a program of material, control and product testing is the availability of the right man to originate and supervise the program. Technical men in the plants should set the programs up so that they are feasible and are used to greatest advantage. Once the procedures are set up, they can be run by any young fellow or girl who will take an interest in the work and follow the methods conscientiously. It is a waste of valuable technical help to keep a trained engineer on a routine test job indefinitely. This is a very good place to start an engineer on his first job after leaving school. In this way he becomes familiar with the company, since he will learn a great deal about the plant and its operation, but once this training period is complete it is up to the management to place him in another job where he can use his technical knowledge to greatest advantage. A technically trained man can be a great asset to a company, but not unless he is given the chance to prove his worth.

In conclusion, it should be pointed out that routine testing of raw materials, materials in process, and the finished product are a sound investment, since they help produce a more uniform and superior product with noticeable savings in material and reoperations.

Adapted by the author from a paper before the Chicago District Enamelers Club.

More Industry News and Personals

Postwar market for stampings discussed (P.M.I. district meetings)

The outlook for postwar markets for stampings was a subject of discussion at recent district meetings of the Pressed Metal Institute held in Toledo, Detroit and Worcester. R. A. Dadisman, chief of the Market Development Division, American Rolling Mill Company, who spoke at the meetings in Toledo and Detroit, highlighted the opportunities for greatly increased use of stampings postwar and underscored the importance of training representatives of stamping concerns to serve their customers as "product engineers" in order that they can be specifically helpful in solving design and production problems.

The Toledo meeting was attended by some 35 members of the Pressed Metal Institute. District Chairman, E. M. Tasker, vice president, Toledo Stamping, presided. Mr. Tasker was re-elected chairman of the Toledo district.

G. H. Roberts, president, Detroit Stamping Company, presided at the Detroit meeting which was also well attended. Mr. Roberts was re-elected district chairman.

Carter C. Higgins, vice president, Worcester Pressed Steel Company, was elected district chairman for the New England group at the meeting in Worcester where a round table discussion was held on subjects of immediate importance to the New England members including shortage of tool makers, conditions relating to shipments such as tolerances on quantities and holding of tools.

Pfaff to Round Oak

W. J. (Bill) Pfaff was recently appointed works manager of Round Oak Company, Dowagiac, Michigan. He came to Round Oak from Mullins Manufacturing Company, where he has been associated for a number of years.

In his previous connection Bill has been closely associated with fabricating and enameling.

Newark Enameling Corp. announces plans

The Newark Enameling Corporation is a successor company to the Newark Porcelain Enameling Company, Inc., Bloomfield, New Jersey. The new company occupies the same premises as its predecessor and is engaged in the same war-time activity — that of heat treating of steels.

There is no change of key men in the organization with the exception of Frank Humpel, who was president of Newark Porcelain Enameling Company, Inc. and has since retired. According to Earl C. Miller, president and treasurer, the new corporation intends to remain in the business of heat treating for the duration of the war, after which it intends to resume a full line of porcelain enameling.

Other officers of the company are: Thomas B. Davidson, vice president, and F. O. Miniutti, secretary.

Youngstown announces district sales appointments

The Youngstown Steet and Tube Company has announced the appointment of E. E. Ellwood as assistant district sales manager of its St. Louis District, with offices located at 611

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Top off YOUR POST WAR RANGES with ...

MONARCH ONE PIECE STOVE TOPS

Post war stove designing will create the finest and most attractive gas and electric ranges ever built.

To top off these fine stoves to the best advantage, plan now to use Monarch one-piece, no-seam, no-weld range tops – the choice of leading stove manufacturers everywhere.

These practical, good-looking tops will be ready for delivery soon after the war ends.

MADE IN THREE STANDARD SIZES

36", 38" and 40¼", with 6" back rail from 1½" to 2" thick.

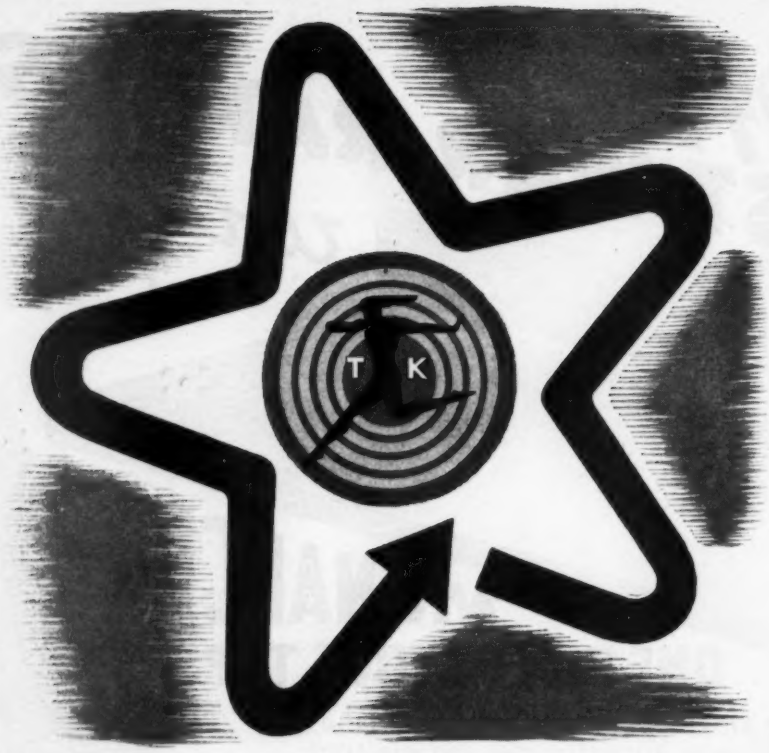
Other range tops and stove parts are designed, manufactured and assembled according to your needs.

MONARCH QUALITY

When you think of Stampings, think of

NEW MONARCH MACHINE & STAMPING CO.

406 S. W. NINTH STREET DES MOINES 9, IOWA



HITCH YOUR WAGON TO THE TK STAR

Tie up with a quality product now and cash in big in the years ahead. Serve your customers with TK replacement units to replace burned out or inefficient units on electric ranges. Here are the TK technical features that assure uniform high quality nickel-chromium resistance wire in perfect spiral centered in magnesium oxide. Rugged precision construction defies the extremes of heat and cold-rust-corrosion-steam, water and rough handling.

There are only 2 sizes of TK units but there are 18 different installations rings that make these units fit all makes of

Electric Ranges

TUTTLE & KIFT INC.

1825 NORTH MONITOR AVENUE • CHICAGO 39, ILLINOIS

MANUFACTURERS • DOMESTIC AND INDUSTRIAL HEATING UNITS • SWITCHES • CONTROLS

NEW EQUIPMENT AND PROCESSES

Water Analysis Equipment

It is reported that Chief Chemical Company, New York, has recently made available a new type water analysis equipment known as "Aero-Titrator." According to the report the new equipment has been used by the Armed Services for both field and laboratory work. It is said to offer the laboratory technician and plant operator a speedy and accurate method for determining water hardness as well as calcium and magnesium content. It is further reported to be readily applicable to industrial use.

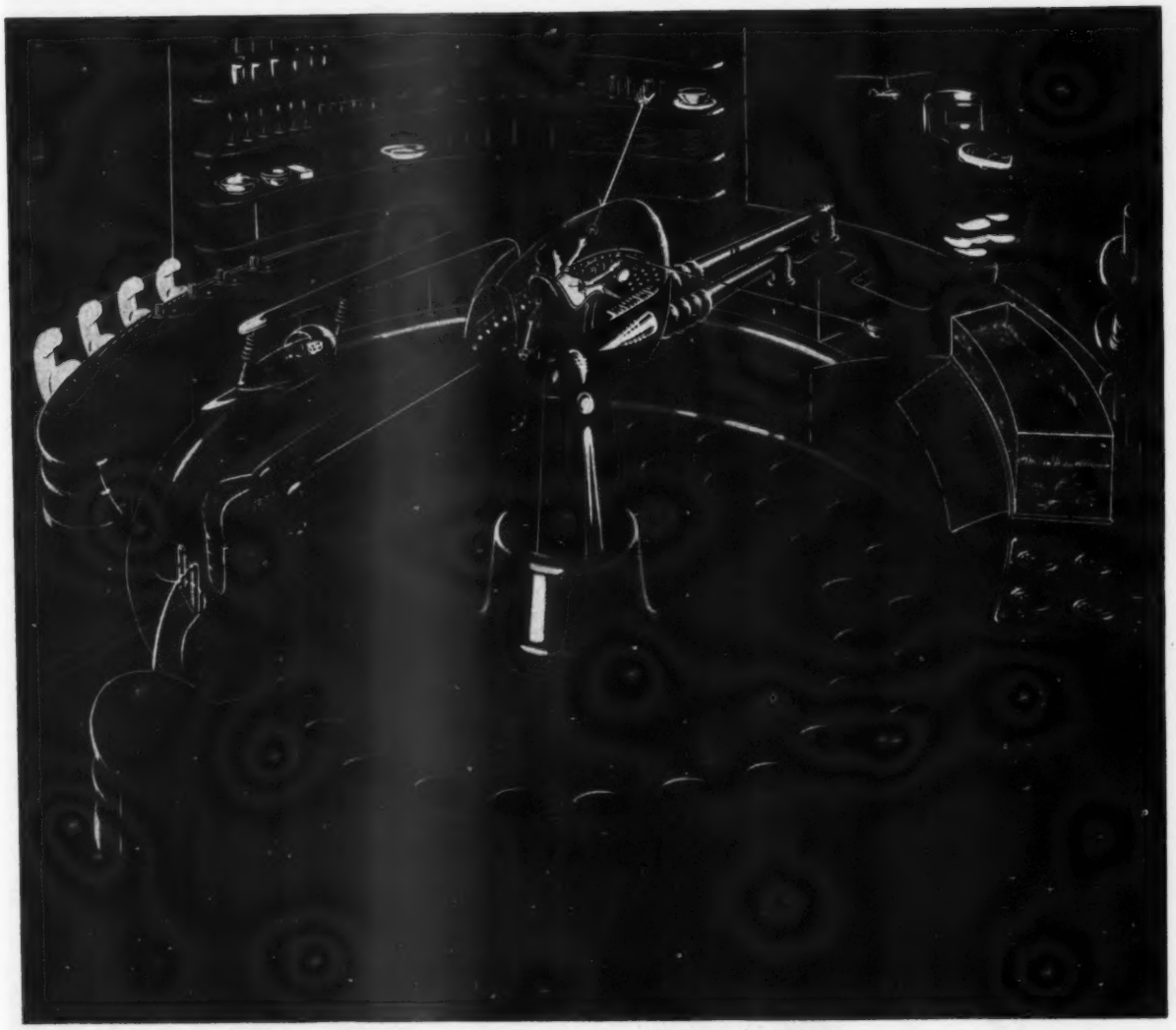
Rigidized sheets for porcelain enameling

The rigidizing process is a new method of cold forming sheet metal. In this patented design-rolling process, the metal is said to be distributed throughout the cross section, giving extra strength and patterned surface effects.

R. S. Smith, president of Rigid-Tex Corporation, Buffalo, N.Y., suggests that "Rigidized" sheets eliminate the problem of "waves" in panels for architectural use. And, that the use of Rigidized Metals will not interfere with the normal fabrication methods used for the materials involved.

Rigidized sheets are offered in a wide range of designs. However, two definite patterns are suggested as practical for adaptation to porcelain enameling: A coarse pattern suitable for use as a sign panel, with either block or cutout letters set away from the panel, and a finer pattern of distinctive design.

Porcelain enameled ware is your best bet for cooking acid fruits.



By The Wrangler

When the boss up and sez I cud have me a job scribblin for this sheet he sez if you can show up with some new idees for the readin folks. Sez I, that won't cause me no troubl — just turn me loose. You see what he don't say is that they hav to be my idees.

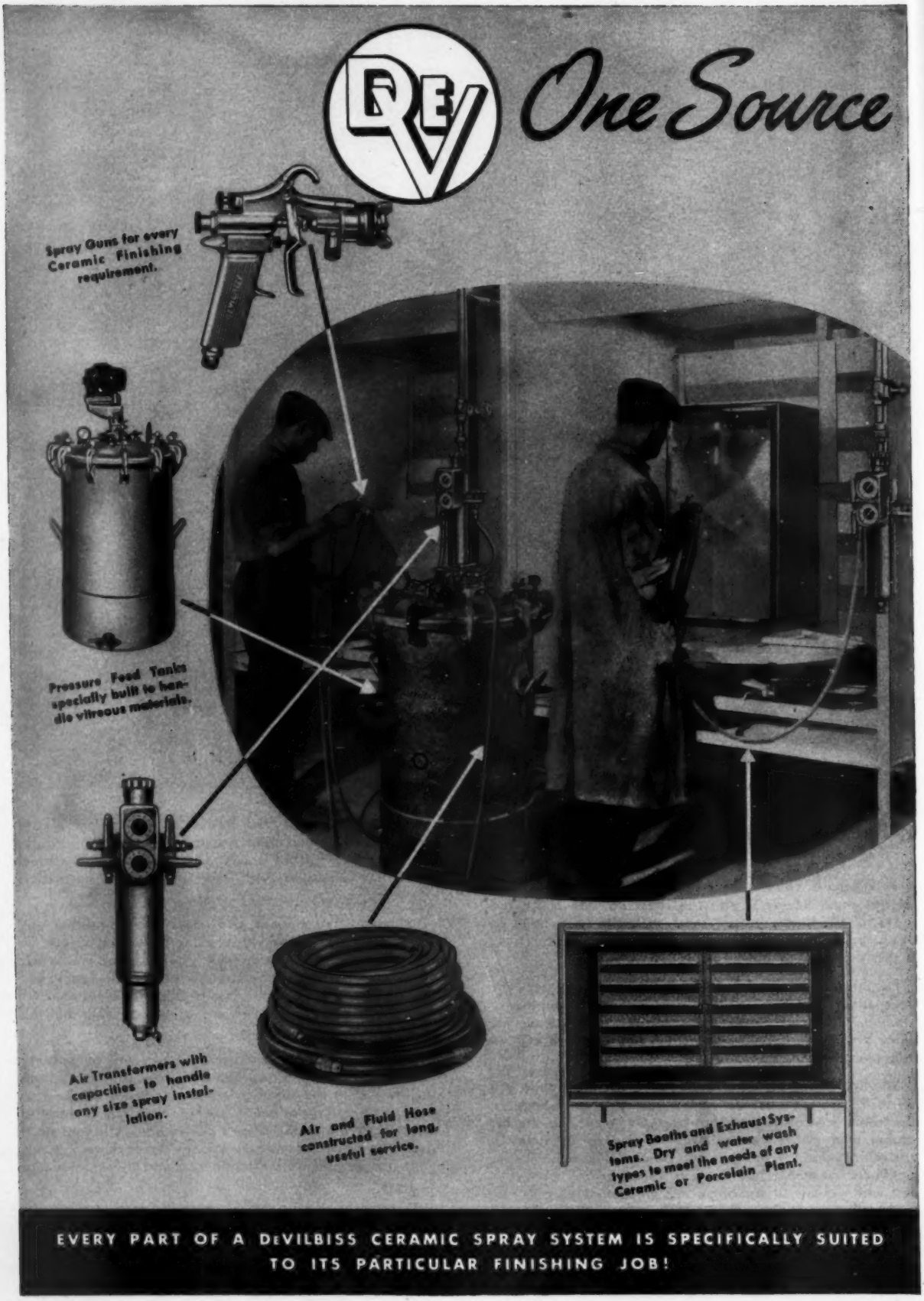
For this here job I want to toss the credit to The Schaible Company (better plumbing and heating equipment), Cincinnati, Ohio. They claims it wuz submitted by the office boy. I kinda think there cheef designer went screwy from overwork.

We figurd on numberin the features but when they got up to 20 we give up. Here's a few of em. Complete electronik controls in operaters booth — giant cup-strainer kitchen floor convertible to swimmin pool — escolater to operators booth — flit gun for pesty salesmen — super rockin rocket cradle for "baby of tomorrow" — convayer belt with "meals of tomorrow" — mechanical "reachers" to handle any jobs not controled by electroniks. — streamlined sinks "just to make the room look like a kitchen" — powdered dust that turns into pre-dehydrated food "flowers of tomorrow"—chemical garden raises pre-dehydrated fruits, vegatables and fish — a unit which sifts foods from chemicals, fast freezes it and makes it into capsule meals — electronik stove burner (with apologies to Kuttle & Tift) for old fashuned people wantin a casional hot meal — windows with one way vision on nabers side — — —

That seems like a speel, but you ain't seen nothin yet. This kitchen is completely pre fabricated complete, in complete "factory of tomorrow" (with complete music while you work) ready for complete shipment in "package" complete with a complete "master plumber of tomorrow" to hook it up complete. We want to make it clear that this here kitchen is COMPLETE.

Whats more, we understan this kitchen will be entirely air condishuned with a new heatin system using bottld sun rays. (Bottld in the summer, compressed and allowed to escape as necessary for heatin. In winter cold rays is bottld for coolin.) From all the dope I get from my effishunt stool pidguns the beuty of this here kitchen is that its vary cheep to by, it dont cost nothin to operate and its garanteed to give peace and contentment.

If you want more informashun write to Utopia Products, Inc., 7 Heaven-Can-Wait Street, Show Me 1, Misouri. If you don't get no results there I suggest you shoot a note to The Schaible Company and ask them what the hell they turned this thing loose for in the first place.


DEV
One Source
Spray Guns for every Ceramic Finishing requirement.
Pressure Feed Tanks specially built to handle vitreous materials.
Air Transformers with capacities to handle any size spray installation.
Air and Fluid Hose constructed for long, useful service.
Spray Booths and Exhaust Systems. Dry and water wash types to meet the needs of any Ceramic or Porcelain Plant.
EVERY PART OF A DEVILBISS CERAMIC SPRAY SYSTEM IS SPECIFICALLY SUITED TO ITS PARTICULAR FINISHING JOB!

for All Ceramic Spray Needs

The complete DeVilbiss Line assures fully-coordinated spray systems built for all ceramic requirements

WHATEVER your finishing requirements may be, you can rely on DeVilbiss as *one source* that can meet *all your needs.*

The broad DeVilbiss Ceramic Spray Line has all the necessary equipment items—from spray guns to exhaust systems—in a range of styles and sizes to meet any requirement. Each is designed and built to operate perfectly with all other parts of the spray system. And this enables DeVilbiss engineers to select the component parts that are best suited to the specific requirements of the user's product, spray materials, finishing specifications and plant set-up.

Because *every* DeVilbiss Ceramic Spray System is specially selected for its job, users are assured of a greater measure of efficient performance, quality workmanship and long, dependable finishing service.

DeVilbiss offers you other advantages, too. Because spray equipment in ceramic use is subject to extreme wear due to the characteristics of vitreous materials, the DeVilbiss System is specially designed to resist rust, corrosion and wear. And years of *direct factory contact* with an immense variety of individual ceramic requirements has given DeVilbiss engineers the experience so essential in prescribing and producing the most efficient spray systems.

The performance records of DeVilbiss Equipment throughout the ceramic industry—in large plants and small—on products of all sizes and shapes—conclusively prove that there are worthwhile advantages to be gained by relying upon the complete DeVilbiss facilities for your future finishing needs.

THE DeVILBISS COMPANY • TOLEDO 1, OHIO
Canadian Plant: Windsor, Ontario

DE VILBISS
Spray Systems

SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS

Enamels to new steels *(cont'd from Page 37)*

standards and be given sufficient authority to see that no deviation from the standards is permitted.

Having provided the equipment, the technician and the standards of operation, the workers or those actually producing the ware must be trained to carry out the operations without deviation from the standards established, and be instilled with the desire to produce one-coat ware because they have been informed of the resultant advantages.

This means that ware in process must be handled with the greatest of care through all steps of the operation — with far greater care than has been customary in most shops in the past. The enamel must always be milled to the same specifications and the enamel applied uniformly. Thickness measurements should be carried out frequently to insure that the application of the enamel is always uniform. The bisque should be handled carefully to avoid scuffing, as this will expose bare metal and thereby result in defective surface conditions.

New requirements for pickling

As an example of the care and control required, and as an illustration of special techniques in pickling, I will dwell on the pickling operations in some detail. The accompanying table illustrates comparative pickling standards as determined by laboratory research, plant practice in at least one commercial demonstration of white direct on steel and the pickling practice normally used and recommended for the application of standard blue ground coat.

The essential difference between the pickling of steel for the application of white as compared to normal practices for blue ground coat is the absolute necessity of eliminating all iron salts from the surface of the steel. The usual light straw colored deposits on the steel that are recognized as doing no harm for normal blue ground coat application can not be tolerated for the successful application of white direct on the steel. To eliminate the formation of these salts the acid rinses, as specified in the table, are recommended; the nickel strike concentrations and acidity must be closely controlled; and the time of exposure of the metal to the air between the successive steps of the pickling operation held to a minimum.

Application and firing

In the application of the enamel

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Comparative Pickling Data

	White on Steel		White on Blue Ground Coat
	Laboratory (Research)	Shop (Production Trials)	Recommended Standard Practice
1. Cleaning			
Immersion Time	30 minutes	6 min. each in 2 tanks	.....
Solution Strength	6 oz. per gal.	a. 12 oz. per gal. b. 9 oz. per gal.	a. 3 to 5 oz. per gal. b. 6 oz. per gal. minimum
Temperature	Boiling	Boiling	Boiling
2. Cleaner Rinse			
Immersion	5 min. hot water 3 min. cold water	25 seconds hot water 25 seconds hot water Cold water immersion & spray rinse — 25 seconds	180° F. Warm rinse
3. Acid Pickle			
Immersion	10 minutes	5 minutes	10 minutes
Solution Strength	7% H_2SO_4	7½% H_2SO_4	6-8% H_2SO_4
Temperature	140° F.	150° F.	140-160° F.
4. Acid Rinse			
Immersion Time	5 minutes	25 seconds (Rinse)	3 minutes
Rinse Medium	Water plus H_2SO_4 (pH 3.0)	Water Spray	Water
Temperature	Cold	Cold	180-190° F. or cold water if rusting is in evidence.
5. Nickel Dip			
Immersion Time	10 minutes	6 minutes	4-6 minutes
Solution Strength	1 oz. per gal. single Ni salts	1½ oz. per gal. single Ni salts	½ to 3 oz. per gal. single Ni salts
Temperature	160° F.	160° F.	150-160° F.
pH	3.5 (Note: Adjust pH by addition of H_2SO_4 or NaOH. Never by Ammonium Salts)	4.0 (Ni deposited 0.09 grams per square foot)	5.4 - 6.2
6. Nickel Dip Rinse	None (Danger of iron salts. If rinse is necessary use cold water with H_2SO_4 — pH 3.0)	25 seconds — cold water	Water at supply temperature
7. Neutralizer			
Immersion Time	4 minutes	6 minutes	No time recommendation
Strength	0.2 oz. per gal. Sodium Cyanide 0.35 oz. per gal. NaOH	0.25 oz. per gal. Sodium Cyanide	0.2 grams per gal. Sodium Cyanide 0.3 — 0.5% Na_2O
Temperature	120° F.	150° F. Additional operation Borax neutralizer — 25 sec. immersion & spray — ¼ oz. borax per gal. — Temp. 160° F.	120-130° F.

How to be sure your postwar products are quality CLEAR THROUGH

YOU'LL have newly developed frits to work with. You'll have a wider range of attractive colors. You'll have improved designs, longer-lasting, more impervious finishes.

But to take full advantage of these finer finishes, they should be applied on a base metal of equally outstanding quality . . . a base such as U·S·S VITRENAMEL. Only then will permanence and maximum customer satisfaction be assured. Only then will your porcelain enameled product be quality "clear through."

U·S·S VITRENAMEL Sheets are unsurpassed for ductility, for forming, welding and fabricating adaptability. They are rigid, strong, flat. Their specially-processed surfaces result in an extremely tight bond between frit and metal. They are the result of many years of intensive research into the best possible base for the best possible enamel finishes.

And the famous U·S·S VITRENAMEL Label, known and trusted by millions of Americans as the mark of good steel, will give any product which bears it a distinct sales advantage in the postwar markets.

We urge you to consult our VITRENAMEL engineers on any of your present problems or future plans involving base metal for enamel products.

U·S·S VITRENAMEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Export Company, New York

UNITED STATES STEEL

Identification display should be part of store front design

(continued from Page 15)

tain the popularity it has gained in the past few years. It lends itself to most store fronts with harmony and with compulsion, but without distraction. There is also a greater inclination toward the use of silhouette lighting with stainless steel base, especially for quality merchandise. Double-faced, stick-up and flush signs too, are highly desirable display material.

Another trend which is fast taking hold in the design of outside lighting display is the illuminating of store entrances. Psychological surveys prove that a lighted entrance will attract more people than a darkened or shadowed entrance.

Most identification displays are leased and maintained, and maintenance practically eliminates obsolescency, which proves the economy of sign operation for the individual merchant. In his expenditure on a sign, the merchant should consider the size of his store, his volume, and the amount of traffic passing by his location or in his block.

Color enters the picture of your identification display just as prominently as it enters your window display and your interior. Most lighting sign manufacturers maintain a stock of at least 35 or 40 standard colors of porcelain enamel. Consult with your manufacturer and with your architect regarding the color for your sign. See to it that it conforms with the style of your store front and with your interior — also the quality of your store and your merchandise should be a guide in choosing the color for your identification display.

An increasing number of stores are playing up trade marks over the logotype in their sign displays. This has proved as effective as trade marks on letterheads and in newspaper advertising. It gives the passers-by a chance to identify your store doubly at one glance — by name and by trade mark.

A suggestion for relief from scumming in antimony-free enamels

(continued from Page 17)

its possible affect on scumming. Inasmuch as the handles which had caused us difficulty would show scum if they were left from only two to four hours after spraying and drying, we decided to use these as test samples.

A series of formulas were run, including such changes as the following:

The amount of zinc oxide included was varied from ½ oz. to 4 oz.; sodium nitrite was varied from 0 to 3 oz.; opacifiers were varied from 0 to 2%; aging tests in the bisque state were varied from 4 to 112 hours.

The final result of this testing was the standardization on a formula that has now been run in production over a period of weeks with absolute freedom from any scumming tendency.

We found one formula with absolutely no scumming after 112 hours aging. This formula is:

Formula "C"

Antimony-Free Frit	100 lb.
Clay	7½ lb.
Opacifier	0
Sodium Nitrite	0
Potassium Carbonate	4 oz.
Zinc Oxide	1 oz.

Although our tests did indicate that sodium nitrite and opacifiers which we had used in earlier formulas showed slight scumming tendencies, we wanted to use some sodium nitrite to prevent tearing and also wanted to use at least a small amount of opacifier to augment the natural opacity in the frit.

Final formula proves satisfactory in production

The result of all of our testing was the standardization on a formula which incorporated the mill additions we felt were essential and at the same time showed no scumming after as long as 72 hours aging. The opacifier and sodium nitrite were returned to the formula, but with the addition of the zinc oxide any scumming effect that might be attributed to the chemicals was entirely overcome. This formula is:

Formula "D"

Antimony-Free Frit	100 lb.
Clay	7½ lb.
Opacifier	1 lb.
Sodium Nitrite	1½ oz.
Potassium Carbonate	4 oz.
Zinc Oxide	1 oz.

We would not want to suggest this formula to other enamelers as a cure-all for, as is many times the case, what appears to be the answer to a problem in one plant might not prove equally effective in all enameling plants.

Our production results to date do lead us to believe that the use of zinc oxide may be the answer to the scumming problem in *our* plant. We pass this information on to other enamelers with the thought that they may want to run similar tests where scumming conditions are encountered.

As to whether the use of zinc oxide in a mill formula would have comparable affect on other types of frit which might show some tendency to scum we do not know, as no comparable tests have been run. This might make an interesting study for any enameler who has this problem.

NEWS → *From Page 42*

Shell Building, St. Louis, Missouri.

A simultaneous announcement covers the appointment of J. P. Feagley as assistant district sales manager of the company's New York District, with offices located at 500 Fifth Avenue, New York City.

Mr. Ellwood formerly covered upper New York state for Youngstown, and Mr. Faegley was a sales representative for the company in the New York office.

Sauces for steamed puddings are kept warm easily if they are placed in a porcelain-on-steel double boiler and kept on low heat.

GOOD MERCHANDISING
includes
GOOD PACKING

WOODEN BOXES AND CRATES—ALL KINDS

Plywood • Wirebound • Hinge Corner • Nailed Crates • Wood-Steel • Nailed Wood • Shop and Tote Boxes

★ Consult with our packing engineers. We offer you the services of our designing and testing laboratory without obligation.

CHICAGO MILL AND LUMBER COMPANY

111 W. Washington Street Chicago 2, Illinois

Pioneers for Over 60 Years

Plants at: Helena, Ark. • Greenville, Miss. • Tallulah, La. • Chicago, Ill. • Plymouth, N. C.